Markets in Health Care: An Analysis of Demand, Supply and the Market Structure of Health Care in the Philippines

by

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Abstract

This study sought to examine the economic structure of the Philippine health care system, in the light of recent legislative initiatives in the country and global managed market reforms. In the context of a market-orientated system in the Philippines, the study modelled the interaction of health care agents in three markets: regulations, financing or insurance and health services. The bulk of the research examined the nature of exchange in the health services market, using neo-classical economics. Theories in industrial organization and public choice served as organizing frameworks for explaining other market elements. The study's methodology used primary and secondary data analysis, as well as findings of other research, to bring together a coherent picture of the market structure of health care in the Philippines.

The analysis of the regulatory market showed that the rent-seeking nature of Philippine social, political and medical institutions has weakened regulatory structures in health care. Compared to its Asian neighbours, the relative position of the country in the 60s in terms of major health indicators, has been eroded. Limited resources and allocative inefficiencies have affected the government's ability to fulfil its constitutional mandate to ensure minimum levels of care, especially for the poor.

The performance of the market was examined in terms of health policy objectives of efficiency and equity in the financing of health care. Private sources, with households forming the bulk, comprised 64 percent of health care expenditures. The position of concentration curves drawn to illustrate the equity of household financing, showed inequities in health and health expenditures. The largely fee-for-service system operating in the health insurance market had caused risks to be borne largely by consumers and funders. Low coverage of the population and weak utilization rates, may have encouraged some providers to behave opportunistically. An examination of the prospects for an alternative system of compulsory health insurance, illustrated through a project with health maintenance organizations indicated the problems of contracting.

Estimates of health service market conditions on the demand-side, from an out-patient provider choice model, showed low price and time cost elasticities, with the poor being more responsive than the rich. Simulations showed that the introduction of user fees in public services were likely to drive demand towards private care in urban areas, and out of the market in rural areas. The welfare effect estimates showed that if public

hospitals were to charge one-half the price of private doctors, the welfare loss would be about 10 percent of household budget of the lowest income group. The amounts needed to compensate losers from the policy change can be transformed into contributions for risk-sharing schemes.

From the supply-side, the distribution of facilities, productive resources and technology were shown to have wide variations across regions and types of facilities. The study cited research that showed that total cost structures in hospital firms were largely determined by the volume of services rendered. Moreover, variable costs were shown, by other research, to be neither influenced by scale nor by the scope of operations.

The analysis of the market structure, based on a modified Hirschman-Herfindahl measure, showed that no hospital-firms had a dominant share of the market. Regression results, from the same research on total cost functions, showed that hospital outputs were unresponsive to actual competition. Price competition appeared to be swamped by non-price competition. An examination of pricing behaviour showed widespread cost-price mark-ups, reflecting the 'market power' of providers. The co-existence of competitive and monopolistic tendencies in the health care market, combined with weak and/or distortive incentive structures, suggests that the tenets of contestability analysis were not fulfilled.

The last chapter showed the limitations of the analysis in providing conclusive evidence on the behavioural underpinnings of the health care market in the Philippines. Conceptual and methodological difficulties, arising from data and measurement problems, imply that the results are at best exploratory; and that further work can use the issues raised as starting points. For health policy reforms in the Philippines, recent legislative initiatives could improve health sector performance from a three-pronged approach: enhancing access, agency and co-ordination.

To my parents,

Glicerio, Jr. and Julieta Ginson

husband,

Ernesto D. Bautista

children,

Carla Emmanuelle, 8 years old

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Ad Majorem Dei Gloriam!

List of Abbreviations

BHS	Barangay Health Stations
BLR	Bureau of Licensing and Regulations
BPW	Baumol, Panzar and Willig (authors)
CAR	Cordillera Autonomous Region
CME	Continuing Medical Education
CT	Computerised Tomography
CV	Compensating Variation
DAP	Development Academy of the Philippines
DOH	Department of Health
ECG	Electrocardiogram
EOS	Economies of Scale
FIES	Family Income and Expenditures Survey
FIML	Full Information Maximum Likelihood
GNP	Gross National Product
GDP	Gross Domestic Product
GSIS	Government Service Insurance System
HHI	Hirschman-Herfindahl Index
HMOs	Health Maintenance Organizations
IIA	Independence of Irrelevant Alternatives
ILO	International Labour Office
IMF	International Monetary Fund
ISH	Intergrated Survey of Households
ISI	Import Substitution Industrialisation
LFS	Labor Force Survey
LOS	Length of Stay
MRI	Magnetic Resonance Imaging
MNL	Multinomial Logit
NCR	National Capital Region
NDS	National Demographic Survey
NEDA	National Economic and Development Authority

NHS	National Health Survey
NMNL	Nested Multinomial Logit
NSO	National Statistics Office
PMA	Philippine Medical Association
PCM	Perfectly Contestable Markets
PIDS	Philippine Institute for Development Studies
PMCC	Philippine Medical Care Commission
OECD	Organization for Economic Co-operation and Development
OPC	Out-patients
RHN	Rural Health Nurse
RHU	Rural Health Units
RITM	Research Institute for Tropical Medicine
RUV	Relative Unit Value
SSS	Social Security System
US	United States
WB	World Bank
ZCA	Zip Code Areas

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Chapter 1

Introduction

1.1 The Context, Aim and Objectives

There have been dramatic developments in the health sector in the Philippines from the late eighties onwards. The first significant legislation was the 1988 Generics Law[1] which required generic labelling and prescribing. This affected the private health industry, i.e. the drug companies and professional groups, the most. The second piece of legislation involved the decentralization of the control, financing and accountability of government health facilities and services to local governments[2]. More recently, before the May elections, a National Health Insurance Act[3] was passed which sought to bring together the separate administration of funds for the compulsory health insurance programme into one body. These developments are changing, and are likely to change still further, the way the health sector is organized in the country.

These initiatives did not come about from some pre-determined blueprint for change; but were introduced piecemeal in a somewhat ad hoc manner. The inclusion of the health sector in the Local Government Code was unexpected, as it appears to have been generated solely from Congress with minimal Department of Health participation. Even up to the present, bills are being introduced to attempt to revert to the system of central and integrated administration and financial control. The Generics Act was undertaken in a more deliberate and co-ordinated manner than the

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[1]The Generics Act of 1988; Republic Act (R.A.) 6675; Approved September 13, 1988; 84 Official Gazette (O.G.) 5588 No. 38 (September 19, 1988).

[2]The Local Government Code of 1991; R.A. 7160; Approved October 10, 1991.

[3]National Health Insurance Act of 1995; R.A. 7875; Approved February 14, 1995; 91 O.G. 2299 No. 16 (April 17, 1995).

Decentralization Law. The new government, which replaced a period of authoritarian rule, had to take an initiative that reflected its populist concerns. The Department of Health organized task forces to generate information and popular support for the legislation; this was important given that organized medicine and multinational drug companies were opposed to it. The National Health Insurance Act benefitted from some research[4]. But the law itself just involved organizational changes to combine the two funders of medical insurance, and the guidelines for its implementation have not been drawn up. There appears to be no clear commitment on the source of funds for the programme.

These policy developments taking place in the Philippines beg for more than a single-pronged, problem-focused approach, for they challenge the underlying structure of health delivery and financing, and ultimately, the practice of medicine in the country. They point to the changing role of government in the health sector. They raise questions on the future of the market-driven system which characterizes the Philippine health environment. Without a coherent understanding of the market and non-market forces that shape, and are likely to guide, these changes, the legislative initiatives referred to above may end up as a mere reformist attempt to attract votes without recognizing the opportunities they offer for structural reform.

Considerations of strategic reforms should start with an understanding of the underlying structure of the health care system in the country. This study aims to provide such an analysis. It is an economic study of the health care market that is intended to contribute towards the better grounding of political decisions in an

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[4]Research were conducted under the Health Finance Development Project, sponsored by the United States' Agency for International Development (USAID).

economic framework. The piecemeal manner in which the bills have been introduced suggests that their implementation will not create the impact that they should.

This study is not an evaluation of the legislation referred to above. Rather it is an analysis of the structure of the health care market to determine the conditions likely to affect the implementation and outcome of legislation and to assist in the reorganization of the health system in a rational manner. Specifically, the investigations are directed towards answering the following research questions: 1) How is the health system organized? What is the nature of the regulatory framework? 2) How does the system of health financing perform in terms of efficiency and equity? 3) What are the factors that affect demand for health care? What, for example, are the effects on demand of changes of prices for out-patient care? 4) What are the underlying supply conditions, particularly the technology and costs structure of production of hospital services; and, 5) What is the market structure for health care? To what extent is it price and non-price competition operating? The work concludes with a discussion of the study's implications for policy developments directed at managing the market in health care; and, indicates further work that needs to be undertaken in the light of the issues underlying the market structure of health care in the country.

1.2 Significance

The example presented in the Philippines, with its market orientation in health care, can inform policy debates in both developed and developing countries trying to proximate the competitive ideal. Health care reforms taking place in many countries are directed at introducing market mechanisms and incentives into public systems (Saltman and van Otter, 1992; Le Grand and Bartlett, 1993). The trend in reforms in

developed countries finds parallels in developing countries in the various policies that introduce market elements like pricing, through the introduction of user fees to previously free systems and greater public-private interaction through contracting (McPake, 1993; Bennett, 1994). The analyses undertaken in the study can provide policy with simulations on the effects of user fees; as well as information on the responsiveness of costs and outputs of hospital services to prices and other market conditions.

The market structure analysis undertaken in this study offers a unique perspective as it explores aspects of recent theoretical developments in economics, contestability analysis, in particular; and, elements of transaction costs and public choice analyses, to examine their usefulness in illuminating health sector analysis, particularly in a developing country. The tenets of recent theoretical developments in economics can be used to explore health policy concerns that arise from interactions among health care agents, in the context of incentive problems posed by the 'commodity' health care.

1.3 The Theoretical Framework of the Study

This section sets out the theoretical framework of the study of the economic structure of health care in a pluralistic system. The first section identifies the boundaries of economic analysis. The second part examines the underlying objectives of a health care system. The third part analyzes the nature of the 'commodity' health care.

1.3.1 Economic Boundaries

Health care comprises the set of activities which can bring about better health by specifically directed activities. The pursuit of health involves the use of resources. The domain of economics is analysing the ways that the resources used in health care can yield the most efficient and equitable outcome given their costs. The resources expended on health care are resources lost to other activities. The realm of economics as a discipline is precisely to inform on this process of choice.

The behaviour of interest in economics is one of optimization. The analysis starts from the perspective that preference patterns, given the feasibility constraints of agents, can be mapped and yield behaviour that can be consistent with maximization. For consumers, optimization means choosing the quantity of goods and services that yields most satisfaction within given price and income constraints. For firms, deciding on the type and quantity of outputs that will yield the desired profits entails taking into consideration the cost of inputs. These atomistic agents, starting-off from a self-interested perspective, come together to form the market, and without influence on price, bring about a state of equilibrium in which the costs of every additional good produced is equal to the price at which the good can be sold. Neo-classical economic theory predicts that this competitive equilibrium is optimal and efficient when there is no other way by which resources can be allocated which can make everyone better off: Pareto Optimality. However, market conditions may dictate that only one or few firms can be an efficient configuration in the market, in which case, it has been suggested, that the same efficient outcomes can be achieved by the mere threat that a potential entrant many pose on the market when that entry can be accomplished without sunk

costs (Baumol, et al., 1982). This contestability hypothesis expands the 'sway of the invisible hand' in the market.

Equilibrium exchange is assumed to take place within the context of the given initial endowments of ownership of assets and skills. Should the initial distribution of purchasing power result in inequities in exchange, restoring equity is made possible with the compensation of the less well-off by the better off and /or the state by the instituting mechanisms for such transfers. The competitive model views the role of the state as external; and for policy purposes, may consider the role of the state limited to cases where the market 'fails', such as under monopoly conditions; where there are common access resources involved; when consumption of goods are non-rival; and, where exclusion is difficult (as in the case of public goods).

But the state or government may not necessarily be an impartial entity, affecting the allocation of resources towards some ultimate social goals. Governments are also comprised of individuals pursuing their own optimizing objectives. Public choice models focus upon resource allocation processes arising from self-interested behaviour of politicians, bureaucrats and self-interested groups. The choice of one programme or allocation mode may be based on politicans' seeking to maximize re-election chances (Downs, 1957); bureaucrats' trying to maximize the stature of the office (Niskanen, 1975); public workers' seeking to maintain blissful tenure by sticking to routines (Wolf,1979). The various mechanisms these individuals in government may devise, within state allocative processes, to pursue their own selfish interests imply that government allocation can be just as inefficient as the market it sought to replace, suggesting 'government failure'.

Other forms of allocation, outside of markets and governments, have been shown to achieve efficient outcomes. The optimizing behaviour, or its corollary of minimizing costs, has also been applied to the analysis of decisions to form firms or to take the allocation process out of the market: to internalize it within firms (Coase, 1937). The objective function pursued is the 'minimization of transaction costs' (Williamson, 1985), with the latter defined as the costs of running the system. Other forms of collective action operating with formal and informal mechanisms, fall within the purview of analysis of transaction cost minimizing behaviour. The concern with transaction costs stem from the recognition that the central problem of economic organizations are rooted in the behavioural attributes of economic agents. Human knowledge has boundaries (bounded rationality) and that self-interest maybe more ruthlessly pursued without principle or conscience (opportunism). Recognition of such behaviour suggests that information gathering, monitoring and enforcement costs are now embedded in contractual arrangements. It is these costs that determine whether one arrangement is more efficient than the other.

The economic framework for the analysis of the nature of health care interactions can, therefore, provide some coherence to decisions involving choice. The allocation problem in health care, however, may pose analytical difficulties arising from the attributes of the 'commodity' health care. Conceptual and behavioural elements alter the nature of market signals. These attributes are discussed next.

1.3.2 On the Nature of the 'Commodity' Health Care

There are three attributes which are important in understanding the nature of health care as an economic good. They are not unique to health care, but the extent of their influence on health care markets separates it from other types of markets. These are: a) uncertainty; b) externalities; and, c) asymmetric information. These attributes create conditions and provide incentives for certain behavioural and institutional responses which shape the health care market.

Uncertainty. Uncertainty in health care markets arises from two sources. Uncertainties describe the 'state' of prevailing conditions, and uncertainties relating to the decision-making by economic agents. For the consumer, the uncertainty over the randomness of the sickness event is most basic. The participation of consumers in the health services market is, for the most part, determined by their experience of sickness which triggers the medical need for health care. Consumers also face the uncertainty that arises in relation to the diagnosis and outcomes or effects of treatment. Despite (or inspite of) the special training and knowledge, professionals may take advantage of uncertainties to justify recommendations for more diagnostic examinations and other therapies, thereby, raising prices.

Uncertainty involves an assessment of the risk of an event occuring at some future time. In addition to risks associated with existing conditions or known risk factors, the attitude towards risk enters as an independent factor relating to people's reactions to risky situations, and is to be found in many markets. The expected financial loss attendant to seeking care may drive consumers to reach through to the insurance market, either directly or through the government or their employers to secure themselves against this loss. Insurance covers uncertainty by pooling risks across

population groups. Insurance provides the opportunity to pool risks within a band: where the probability (p) of event s occuring falls between one and zero ($1 > p > 0$). Risk averse individuals, for whom $p = 1$, are likely to take up insurance cover. But no firm will provide insurance given this 'certitude'. On the other hand, no demand will be forthcoming when $p = 0$.

In addition to attitudes towards risk, the problem of the market for insurance at all levels is also determined by the ability to pay. The poor, who may include many who are prone to sickness or are already sick, may not insure because they lack funds. The de-selection of those who cannot afford insurance but who may benefit from it often serve to motivate governments to provide the insurance.

Health care interactions are fraught with uncertainties arising from the asymmetries in the structure of information (Williamson, 1985). Voluntary insurance schemes, for example, are confronted by two problems. The first is adverse selection. The problem of adverse selection arises when individuals know their own personal risks better than the insurer and those at higher risk seek cover. They will be adversely selected into schemes which would cause premiums to be higher than the community risk rating, further forcing out those at less risk or those too poor to pay. The practice of cream-skimming through higher premiums, exclusionary clauses on existing diseases, market segmentation, etc., are mechanisms to deter high risk individuals from the joining the risk pool and so restrict coverage to the more healthy and most likely, wealthier population.

A second problem, known as moral hazard, arises when insurance allows the consumer to face a marginal cost at the point of care which is less than the true marginal social cost of provision, leading to higher utilization. Providers, on the

other hand, may, as a result of the perception that the patient does not bear the full cost, increase utilization of secondary services more than necessary. This point is discussed further in terms of information asymmetry.

But the welfare loss arising from these practices may be high for a society and often explain why insurance markets may not be fully developed in some systems, making for an incomplete market for health care (Arrow, 1963).

Asymmetric Information. Asymmetry of information is an important element in health care markets not only because of the uncertainty of health needs but also because of the specialized nature of knowledge and the differences in the objective functions of the agents with regards to information disclosure. While patients seek to inform the doctor as much as possible about what ails him, doctors may not have similar incentives to disclose what they know, either because of uncertainties over diagnosis or outcomes as earlier cited, or it may be as Phelps (1992) aptly describes:

> ...Professional duty, ethics, and personal responsibility make the doctor want to be open and honest. Conflicting with this, however, the simple profit motive can lead the doctor into different choices. Put most simply, if so desired, the doctor might be able to deceive the patient, and make more money doing so...the patient could have no way of telling when this was happening (if at all). (p.6)

The consequences of information asymmetry vary. At one extreme, the costs of wrong information can be life threatening. At the other end, one can "shop around" until one gets the satisfactory information. However, the possibility of obtaining it is limited by the acuteness of conditions and by the difficulty of weighing one provider's opinion against another (Culyer, 1991). For the insurance market, the consequences of information asymmetry, the problems of adverse selection and moral hazard, may account for a breakdown of the market in insurance (Arrow, 1963).

The extent to which ways are devised to solve the problem may result in market outcomes which are not competitive. It is a striking attribute of services in general to develop into personal relationships built on the nexus of trust. In health care, the likelihood that a repeat transaction will be made enhances consumer loyalty to a provider. This personalistic relationship is likely to enhance provider power in terms of rate-setting, and utilization of secondary services in the health services market.

Asymmetric information underpins the licensing of professionals by government. In addition, professional groups evolve codes of ethics to prevent abuse (Arrow, 1963). The benefits of the delegation of some of the functions of government to ensure ethical behaviour to professional groups has to be balanced against the costs of collusive behaviour.

Information asymmetry influencing provider behaviour leads to a moral hazard problem. Moral hazard arises from the provider-side of health care markets when the manner of paying providers by third party payers leads to more services being ordered than necessary. Fee-for-service payments, for example, have been shown not to encourage cost minimization by providers, but instead, encouraged greater use of services by providers (WHO, 1992). This type of behaviour is explained by the transactions cost theory in terms of human attributes of bounded rationality and opportunism. Bounded rationality refers to behaviour which is 'intendedly rational, but only limitedly so' (Simon, cited in Williamson, 1985). Large numbers of transactors prevent efficient monitoring and enhance opportunities to claim payment from the insurance agency for services not rendered or fraudulently rendered. Such behaviour fits the notion of opportunism. It is characterized as 'self-interest with guile'; associated with "incomplete or distorted disclosure of information, and to

calculated efforts to mislead, distort, disguise or otherwise confuse" (Williamson, 1985, p. 51). This clearly creates conditions of inefficiencies and high transaction costs.

The process of transforming health care into health, and the over-all health care interactions are complex. The attributes of the 'commodity' health care make health care different from other goods traded in the market. The complexities arising from uncertainties, information asymmetries and inter-personal valuations engender incentive problems (e.g. moral hazard and adverse selection) which affect the ability of the economic arrangements in health care to achieve health care objectives.

Externality. When consumption or production of commodities by one person affect another, without that person or firm choosing to be so involved, externalities are said to exist. Health campaigns like immunization or vector control activities create positive externalities and benefit society as a whole. Failure to take shots or be examined for possible infectious diseases create negative externalities as the disease is likely to spread to the wider population. While seeking health care may yield benefits internal to the person, the benefits accrue to society as well from having healthy citizens. The extent to which individuals do seek care depends on whether the incremental costs of doing so are less than the perceived potential gains. Optimal outcomes are realized when the incremental costs are equated with the incremental benefits. Government involvement in health care often arises because markets may not yield efficient outcomes because of externalities. One's personal valuation of costs and benefits may not coincide with societal valuation of costs and benefits.

However, not every instance of externality need trigger government intervention. Parties affected can get together and some compensation process can be agreed on. The Coase Theorem states that "bargaining can achieve an efficient

allocation of resources whatever the initial assignment of property rights"(Gravelle and Rees, 1992). However, in instances where property rights are not defined, or the legal framework is not clear, or when the benefits are available for everyone to enjoy, then internalization of externalities may not be made and under or over provision may result. The latter is said to be common in health care where capacities and use of advanced techniques reflect on reputation, an important element of the medical profession's objective function (Evans, 1984).

1.3.3 On the Nature of Health Care Objectives

The ultimate objective of a health care system is "to advance and protect the health of people"(Roemer, 1991; p. 32). Advancing health means combatting disease, increasing life expectancy and improving the over-all quality of life. Other elements in the social system may affect health but health services are the main direct mechanisms through which health care objectives are pursued.

Efficiency. The welfare economics criteria for evaluating resource allocation has been identified earlier as Pareto efficiency. Under this criteria, efficiency in resource allocation is said to occur when no individual can be made better off without at least one other becoming worse off. Production and consumption takes place at the point at which technology and society's feasibility constraints dictate. When a combination of other goods and inputs can make possible a higher level of attainment on society's production possibility frontier, not achieving such level means inefficiency in the strict economic sense. For society as whole, where no reallocation is possible, the marginal social benefit equals the marginal social cost. Operationally, this entails the fulfillment of the following criteria (Barr, 1993; pp. 73 -75):

1. Consumption Efficiency - Two individuals' marginal valuation of one commodity, vis-a-vis another commodity, are the same.

2. Production Efficiency - Factor proportions are so combined to obtain maximum output from given inputs.

3. Efficiency in Product Mix - The input supply and input use yields an optimal bundle at which the ratio of marginal production costs and the ratio of marginal valuation of consumption are equalised, given existing production technology and consumer taste;

4. Administrative Efficiency - Possible gains in output are possible by sacrificing another output without incurring additional costs. Also popularly known as X-efficiency where eliminating waste or managerial slack can yield higher outcomes without increasing costs.

Where initially the allocation is not efficient, in the sense that someone is made worse off in the process of another being made better off, a potential for optimality exists by providing compensation from gainers to losers. A consumer's 'willingness to pay' can serve as basis for compensation: for gainers how much they would be willing to pay to have the change, and for losers how much they would be willing to pay not to have the change. In cases of costless redistribution, where the amount that gainers gain exceed that which the losers lose, then the potential for compensation to achieve optimality exists. This is known as the Hicks-Kaldor Criterion. (Cullis and Jones, 1992: p.40). The Hicks-Kaldor compensation test does not involve interpersonal value comparisons, i.e., whether one utility gain can be worth more than one utility loss (Gravelle and Rees, 1992). The individual makes the judgement through the amounts they are willing to pay or be paid to be made as well-off after the change as before it. The Scitovsky paradox showed that, given costless redistribution, the Hicks-Kaldor test can yield more than one preferable outcome. It can include a reversal back to the status quo, the crux of the Scitovsky paradox, such a shift can be achieved by non-costless redistribution alone, and thus a proviso is needed to the Hicks-Kaldor test, to preclude such a change (Scitovsky, 1964).

In cases where property rights may be ill-defined, the government comes in to undertake the compensation process through transfers[5]. The government's role in a competitive market is to effect the redistribution process, and intervene in cases where individuals may not know what is in their best interest (merit goods argument). In instances where the market may fail because of externalities, information problems and incomplete markets (e.g. absence of market for risk), the nature of government intervention can be assessed and compared to outcomes that would have risen had they been left to the market.

Equity. The concern for equity in pluralistic health care systems stems from the idea that the market system merely reflects the distribution of assets and purchasing power, and that the poor are likely to obtain and use resources differently from the rich. The outcome of market transactions for each group will therefore differ. As Le Grand (1991) aptly comments:

> ...The fact that people will almost inevitably come to the market with different amount of resources from which to generate income will generate inequality in income; this in turn will generate inequalities in the consumption of all commodities and a failure to meet a minimum standard of consumption of some. What is more disputable is whether the inequities thereby generated will be greater than any created by government intervention (p.438).

Assessments of health care delivery and financing are based on the notion that health care is delivered on the basis of 'need' and financed according to 'ability to pay' (Wagstaff, et al., 1993). Commitment to enhancing 'access' suggests a concept of equality anchored on a 'rights-based' principle; i.e. access to health care is a matter of right.

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[5]This is basically a Pigouvian view. Coase (1960) argues the case where in the absence of transaction and bargaining costs, an agreed allocation of resources can be Pareto optimal independent of the prior assignment of property rights (cf. Mueller, 1989; p.28)

In practice, equity is defined in terms of vertical and horizontal equity. Vertical equity in health care implies that those with greater need should receive more services than those with less needs. Horizontal equity, on the other hand, implies that persons with the same need receive the same services. The difficulties that arise when measuring the quantity of service use, quality of treatment and health need, suggests that equity objectives should be contextualised in terms of a country's social objectives, as well as the availability of data.

The allocation decisions undertaken, with market and non-market elements prevailing, e.g. state, firms and other collective actions, take on contracting and bargaining features. The question of distribution of benefits, the sharing of the gains and costs of transactions, can be viewed as outcomes of this bargaining process. The equity problem appears to boil down to a question of balancing the various interests in the transactions: a question of the appropriate design mechanisms to capture the interests of groups disadvantaged by the bargaining process. This study discusses the problems of efficiency and equity in health care in the context of the interaction amongst agents in the health sector.

1.4 Conceptual Framework

1.4.1 Empirical Questions Arising from the Theoretical Framework

The theoretical discussion and the issues arising from the applicability of economic concepts to health care raise several questions for this empirical investigation of the health market in the Philippines.

First, how do the dynamics of state and other non-market elements influence health care organization and outcomes? How do interactions among agents determine the costs of market interactions, and ultimately the structure of the market?

Second, to what extent does the system of financing health care in the country determine the efficiency and equity of market operation?

Third, to what extent are the conditions of demand and supply for health care services determined by market forces? What does the behaviour of prices and outputs tell us about the market structure?

These questions suggest that the health care system in the Philippines can best be viewed in terms of the interaction of agents in response to incentive problems generated by information asymmetries, uncertainties and externalities in health care. The dynamics of interactions in health services, health insurance and regulations are captured in the context of the organizing boundaries of markets. To the extent that these interactions are guided by behavioural rules envisioned by theory, these market interactions comprise institutional arrangements in health care.

1.4.2 Agents and Markets in Health Care

The health care system is defined in Roemer (1991) as the "combination of resources, organization, financing and management that culminate in the delivery of health services to the population" (p.3). A focus on the underlying economic structure of the system entails an analysis that stems from an understanding of the behaviour of economic agents in the allocation of resources. The process of exchange occuring among agents forms the market. Resource allocation in health care then has a market in the sense that there is an interaction among agents, an exchange occurs and a cost and benefit calculation can be made. A markets-based perspective permits the examination of the outcomes of health care transactions in the context of the relative positions of agents. The degree of pluralism in Philippine health care markets reflects on the varying degrees of involvement of a) government; b) third-party payers; and

c) providers. Three types of markets evolve on the basis of the relative influence of these parties.

Health Services Market. The goods or medical services market is where health care exchange occurs, reflected largely in the interaction of providers and consumers. There are other interactions as well, especially in the interaction among other personnel and real resources in the production of health services. If services or goods are received from providers upon direct payments from consumers, which is the system in the Philippines, then this exchange comes close to the textbook understanding of markets. The basis of exchange is the price of the service or good; and the consumer behaves according to his or her estimation of the benefits to be purchased, against the price (costs); a calculus which is "the sine qua non of a well-functioning market"(Reinhardt, 1990; p.106).

The standard theory of competition provides benchmarks in which to analyze allocations in the health services market. Hence, a major part of this study looks into the elements and structure of the health services market. The extent to which consumers behave according to the predictions of theory is made in the study of demand for outpatient care in Chapter 4. The model is specified in such a way that captures differences in responsiveness across income groups; and simulates for effects of pricing in government services. Unlike other markets though, consumers enter the health services market under less propitious conditions of illness and hence may not exercise fully-informed behaviour as he or she would in regular markets, even if he or she bears the full cost of care (Reinhardt, 1990). This puts providers in a dominant position in the market (Evans, 1989).

Whether providers, in this case hospitals, behave according to norms of the market of minimizing costs, is the subject of Chapter 5, which explains the shape of cost functions and examines the responsiveness of output to economic variables in the health care market in the Philippines.

Regulatory Market. As regulations are the means through which the government exercises control over the agents; the effects of these regulations can alter the balance of costs and benefits in the sector. The 'regulatory market' therefore reflects the interaction among agents in the context of the government's regulatory functions. In the context of a pluralistic economy, the government's role is to balance the interplay of forces in the market. It reaches to other agents to secure its goal of assuring and protecting the health of citizens. The capability of government to enter into commitments with other sectors, including the delegation of regulatory functions to the professionals themselves, is determined in part by the socio-political framework. The government's ability to serve as a balancing force in a pluralistic economy is affected by the extent to which provider groups may influence the regulatory process.

The strength of government involvement in health care is reflected in the extensive role it plays in the provision or delivery of health services, their financing, and in regulation. Most developed economies in Europe have the state as the main funder and provider of health services (OECD, 1992) In some countries, like that in the United States of America and the Philippines, government involvement is balanced by strong private sectors involved in the provision and financing of health services. Government licensure of professionals is common to all countries. Other areas of government involvement include: policy-setting, regulations, research and training. The extent of government involvement in health care in the Philippines is discussed in

Chapter 2, in the context of the development of social and political institutions in the country, and its implications for the regulatory framework and health service provision.

Insurance Market. Third-party payers in health care are insurance companies which provide coverage against financial losses that may be incurred in the event of illness. Coverage is based upon premium payments from consumers or contributions from government. Insurance maybe compulsory, that is, established based on state edict, or maybe voluntary and private. Health systems are distinguished by the extent to which insurance is provided by the state or privately sourced by consumers, often with their employers. In Britain, the national health insurance system provides for comprehensive care for all, with funding generated mainly from taxes. In Germany, insurance is provided by various sickness funds organized along occupational groups. In the Philippines, health insurance is privately sought while the employed are also provided with compulsory cover, financed out of payroll taxes. Third-party financing is the least-developed of the health sector markets in the Philippines. As such, its influence on consumer behaviour is hard to capture in empirical research because of small numbers of participants.

Aside from the transactions flowing between insurance systems and patients through premium payments, the insurance market is of interest because of the way insurers transact with providers. It is this transaction that is more influential in determining the market structure, as provider payment mechanisms from large funds may alter provider behaviour.

1.4.3 Limits of the Approach

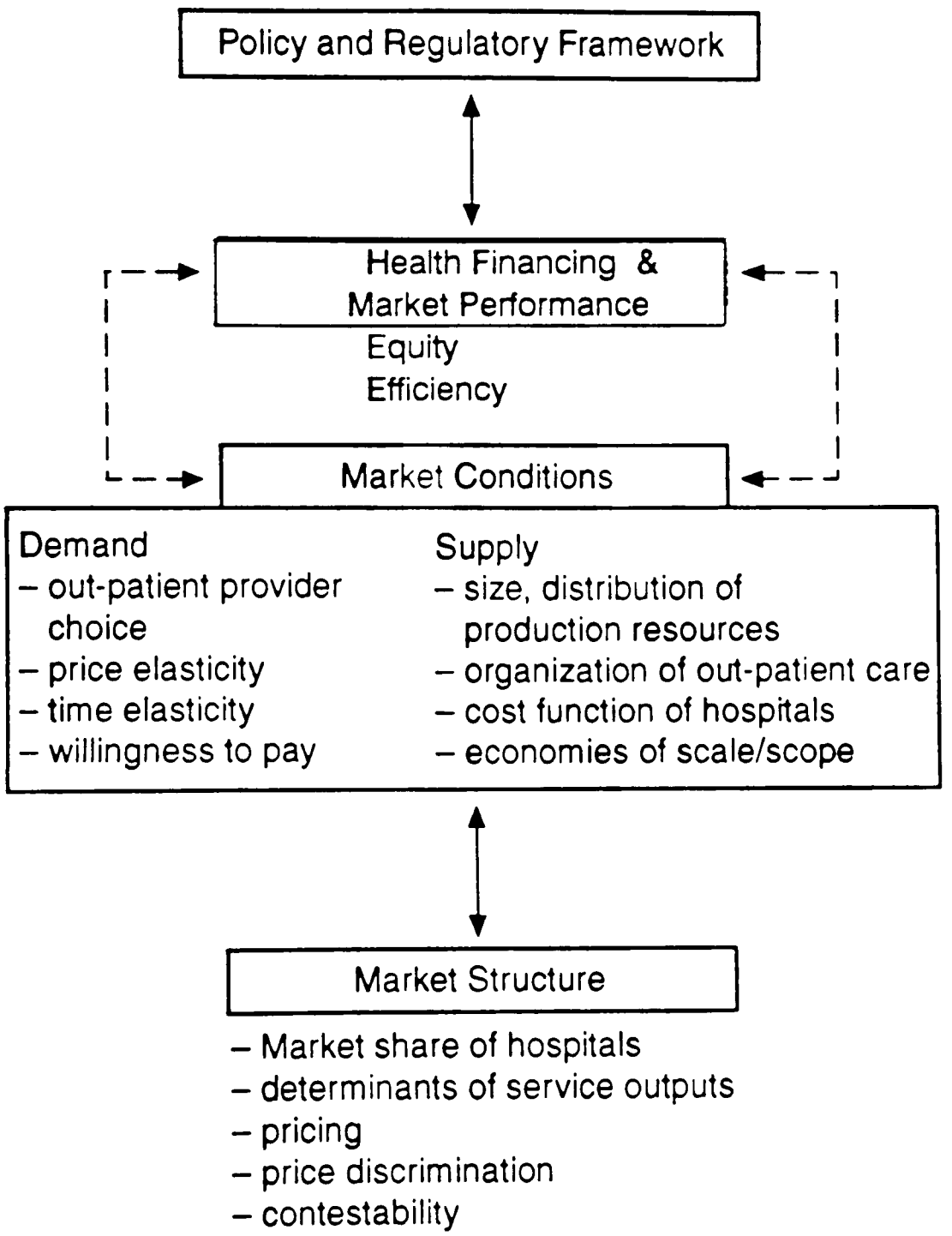
The framework is not meant to be encompassing and comprehensive. There are certain public health concerns that may not easily fit into the framework, for example merit concerns and control of infectious diseases in emergency situations. There are areas or conditions for which no market may exist as the basic infrastructure may not be available. But the conditions under which these circumstances occur can be amenable to analysis, especially in the context of a system of incentives which give rise to certain arrangements in some situations while not in others.

Neither does the study hope to 'test' a hypothesis about market structure, estimating from hypothesized objective functions, first-order conditions and developing a set of predictions. To the extent that hypothesis-testing is developed in standard neo-classical analysis, the chapters on demand and supply utilizes such approach. The analysis on market structure in Chapter 6, draws on the results of demand and supply analysis to examine the contestability of the market structure. For the most part, the discussion on market structure refers to hospital services; while the analysis on demand is for out-patient services. Other information and research works are culled, to build on the analysis of supply and demand to examine the nature of the health care market in the Philippines. Insights from the various theoretical apparatus described above in Section 1.3 are drawn upon to serve as organizing frameworks in the discussion in the respective chapters.

1.5 Organization of the Study

Following the economic framework, the organization of the study is illustrated in Figure 1.1. The regulatory and self-regulatory framework in the health sector is

Figure 1.1
Organization of the Study



examined in the context of socio-economic and institutional developments in the Philippines and the implications for the efficiency and equity of public sector provision in health care are examined in Chapter 2.

The equity and efficiency of the health sector is assessed in terms of the patterns of health financing; examining financing of health services by households against needs; and, assessments of institutional financing are presented also in Chapter 3.

A critical element to defining the nature of the market is the underlying behavioural response of demand and supply to market-based incentives. The choice of out-patient provider and the impact of pricing in the government sector are explained; and price and income elasticities of demand are estimated to determine the responsiveness of demand to changes in prices in the government sector; and willingness to pay for government services, are estimated in Chapter 4.

The conditions of the supply-side are discussed in Chapter 5. The distribution of productive resources in the health sector in the Philippines highlights the conditions of technology in the sector. The study then reports on the results of studies on out-patient clinics from the perspective of a physician-firm, Cobb-Douglas production function estimates of hospital services, and estimates of the economies of scale and scope of these services.

The economic structure of health care markets is examined in Chapter 6. The basic tenets of contestability are discussed. The nature of competition or non-competition is examined in terms of market shares of hospital services, the determinants of hospital outputs, as well the behaviour of prices in the health care market. Based on the empirical evidence provided, the extent to which the market structure in the Philippines can be described as a contestable market is assessed.

Chapter 7 discusses the finding in the light of the limitations of the analysis, and the implications of the findings for research and policy are considered.

1.6 An Overview of the Methodology and Data Sets Used

This dissertation brings together the relevant findings of recent studies on the Philippine health care system to highlight the issues raised in linking market structure analysis to the dynamics of agents' behaviour and policy-setting in the country.

Much of the descriptive analysis is sourced from secondary, published and unpublished, sources. The national data sets used are the 1990 Family Income and Expenditures Survey (FIES), the 1987 National Health Survey (NHS) which is a rider to the Integrated Survey of Household (ISH). All data sets are collected and processed by the National Statistics Office (NSO). The matching of these data sets to yield the equity measures shown here is the first time that such task has been attempted in the country. A description of these data sets is made in Appendix 1.

This study follows an eclectic approach. It combines both descriptive and quantitative analysis, using primary and secondary data. The empirical investigations proceed with estimates of demand side parameters using econometric techniques. Supply-side analysis uses and re-interprets the results of econometric exercises done by other authors to highlight issues addressed in the framework of this study. The chapter on market structure provides a springboard for exploring industrial organization perspectives in an inductive manner, given the empirical evidence provided. Detailed methodological aspects and other conceptual issues are discussed in the relevant chapters.

The broad scope covered by the study, as opposed to a problem-focused study orientation, was dictated in part by availability of information and by the urgent need

of bringing this information together for policy. The information was gathered as part of the activities undertaken during the fieldwork portion of the dissertation research. Much of the analysis using secondary census data and the survey data analyzed in portions of this study rode on a research programme known as the PIDS-DOH Project, for the Philippine Institute for Development Studies (PIDS) - Department of Health (DOH). The former is a quasi- government think-tank conducting economic studies on contract from various branches of government and other funding agencies. The objective of the research project was to gather baseline information for the design of an alternative financing scheme for the country. This author served as principal investigator for the demand study involving a survey on households. The demand and supply portions of the study rely on primary survey data collected under the auspices of this PIDS-DOH Project. A description of these data sets are found in the respective chapters and in Appendix 2.

At about the same time, the United States' Agency for International Development (USAID) was also funding a three-year project for the Philippine government to specifically examine health policy and institutional issues in the Philippine Medical Care System, the compulsory health insurance programme. This author served as one of the co-authors of the background papers on national health accounts (Solon, et al., 1990), health insurance (Gamboa, et al., 1993) and the private medical care sector (Griffin, et al., 1994). Tables from these reports that are used in this study are indicated accordingly.

Chapter Two

Socio-Economic Performance, Institutions, Implications for the Regulatory Framework and Public Provision in the Health Sector

Introduction

This chapter examines the regulatory framework and public provision in the health sector from the perspective of socio-economic and institutional developments in the country. The rate and structure of the economic growth pursued reflects on the health sector not only in terms of the availability of resources for the health sector but also the manner in which the health sector is organized.

This chapter is divided up into four parts. The first part presents a picture of the trends in socio-economic developments in the country. The second part examines the dynamics of the Philippine political economy in terms of the nature of the political, social and economic organization in the country. The third part discusses the regulatory framework, including self-regulation by the health profession. The fourth part illustrates the implications for organization and budget allocations in the public health system.

To the extent that data is available, a comparison with trends in other countries is made. It must, however, be noted that cross-country comparisons, particularly in terms of longitudinal changes in income distribution, poverty, and other social indicators, necessarily suffer from a lack of comparability of the different sources of data and methodologies used. At best they should be taken as portraying a general trend and that further clarification should be made with in-depth analysis of each country.

2.1 A Background of the Economic Development of the Philippines

2.1.1 Socio-Economic and Health Development Trends

The Philippines is a nation of some 7,000 islands straddling the southeast region of Asia (Figure 2.1 for map). Unlike its neighbours who have experienced rapid and sustainable growth for the past decades, the Philippines' economic performance has been uneven. Table 2.1 shows a comparison of the Philippines with other Asian countries. In terms of GNP per capita, it ranks bottom of the group. While other countries grew in real terms between from 5.7 to 8.0 percent in the past three decades, the growth rate of GNP in the Philippines was only 3.1 percent, to rank bottom of the list in terms of growth rate. But as can be gleaned from the table, per capita incomes in 1962 in the Philippines was higher than in Indonesia, South Korea and Thailand, but the eighties saw South Korea and Thailand having per capita incomes which were 4.3 and 1.4 times, respectively, higher than in the Philippines.

This difference in economic performance is also reflected in health status indicators; where the comparative picture remains the same (Table 2.2). Life expectancy in the 60s was highest in the Philippines. But recent estimates showed that its performance surpasses only Indonesia while the other countries have experienced rapid gains in years of life. The rate of change in improvements in infant mortality rates has also been slow. Griffin (1991) observed that if the Philippines had followed the same trajectory path from the 1960s, as countries with similar economic ranking, life expectancy in absolute years would have been about 69 years by 1989 instead of 64.

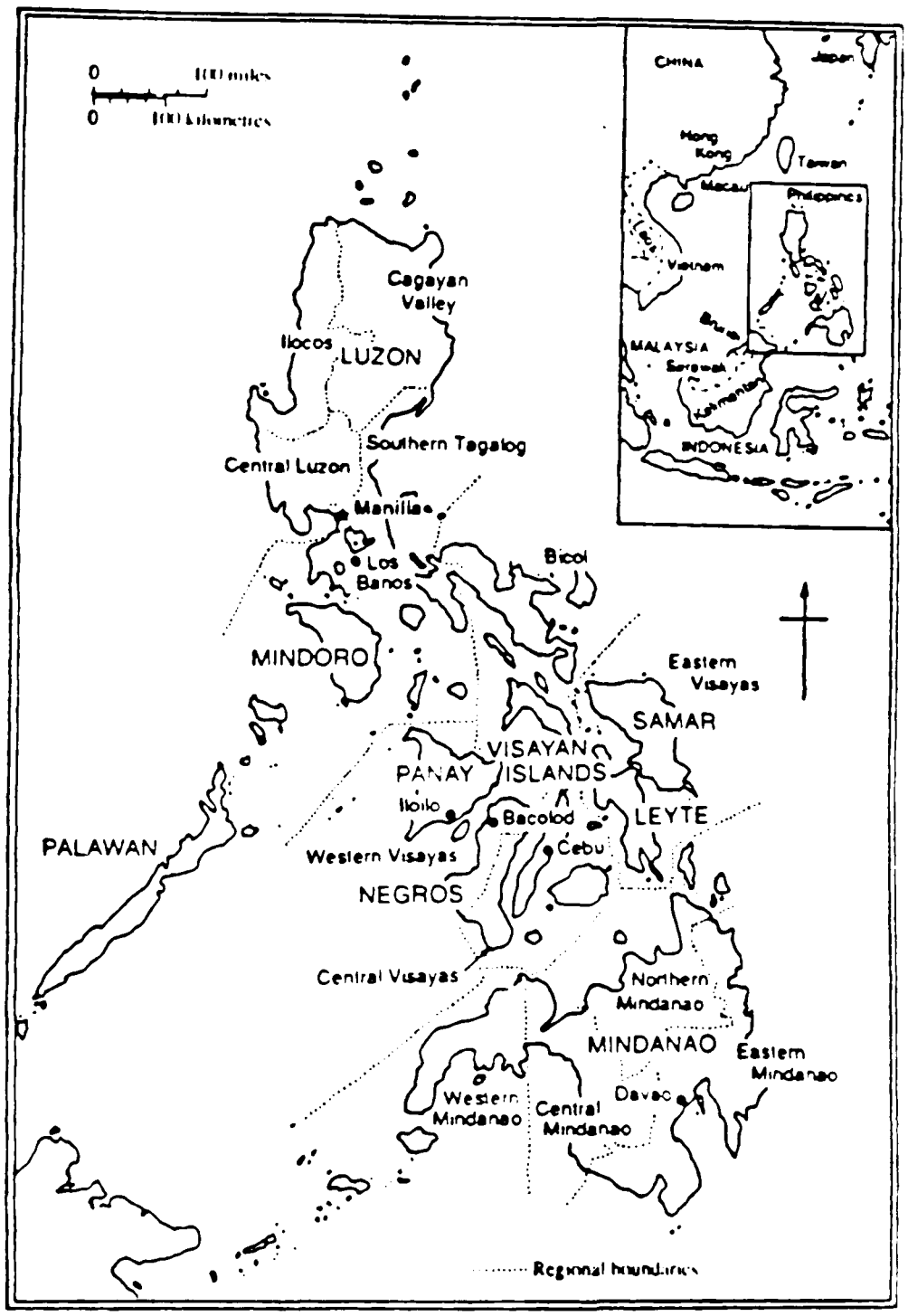


Fig. 2.1: Map of the Philippines

Source:

Boyce (1993)

Table 2.1
Development Indicators for Philippines and Selected Countries in Asia

Country	Gross National Product per capita (1986 US $)		Growth Rate, 1962-1986 (per cent per year)		
	1962	1986	GNP	Population	GNP Per Capita
Philippines	495	540	3.1	2.7	0.4
Indonesia	190	490	6.9	2.3	4.6
Korea (S.)	330	2345	10.1	1.9	8.2
Malaysia	820	1730	5.7	2.6	3.1
Singapore	1500	6765	8.0	1.7	6.3
Thailand	345	760	5.9	2.6	3.3

Note:
Data for Indonesia refer to years 1965-86.
Sources:
Gross national product: GNP at current prices converted to US dollars
using period-average exchange rates and to 1986 dollars using wholesale price index,
all as reported in International Monetary Fund (1989)
Indonesia's GNP from World Bank (1988; p.222)
Population: 1962 populations from UNESCAP(1965. p.228);
1986 populations from Asian Development Bank (1988).

Adapted from Boyce, 1993; p.3

Table 2.2
Changes in Health Status Indicators,
Comparison of Asian Economies

	Indonesia	Republic of Korea	Malaysia	Philippine	Thailand
1 Life Expectancy at Birth					
1960	46	53	58	59	52
1970	49	61	63	58	60
1980	56	68	68	62	64
1990	59	72	71	64	68
Ave. Rate of Change/a	8.8%	10.8%	7.0%	2.8%	9.4%
2 Infant Mortality/b					
1960	128	62	55	72	88
1970	114	47	42	64	55
1980	95	30	28	51	44
1990	74	16	15	41	27
Ave. Rate of Change/a	-16.6%	-35.7%	-34.5%	-17.0%	-32.0%

a/ average for each ten-year rate of change
b/ per thousand live births

Ref. World Bank Tables; World Development Report 1993 for recent estimates

The progress in the reduction in infant mortality rates had been slow compared to Thailand, which started out with high infant mortality rates per thousand compared to the Philippines in the 1960s. While Thailand experienced a 32 percent average rate of reduction in infant mortality rates during the past four decades, the Philippines' reduction in infant mortality rates was just slightly half that figure at an annual average of 17 percent. The relatively slow rise in output and incomes may be attributed to the higher growth rate of population which was the highest among Asian countries, as shown in table 2.1. The GNP-population imbalance resulted in a per capita growth rate of less than one percent. In terms of the demographic profile of the country, the 1980s may have been a peak for crude birth rates (see Table 2.3). The logic of the population momentum implies that the Philippines will be a 'young' nation for sometime. Recent estimates, from the 1993 National Demographic Survey (NDS), showed that 56.8 percent of the population are in the economically active age of 15 to 64 years. Only about four percent are in the 65 years plus age group. This leaves nearly 40 percent in the age group 15 years and below (NSO, 1993).

Population distribution figures show that the Philippines is an urbanized country, moving from being predominantly rural (with only 31.8 percent urban) in 1970 to nearly half (48.6 percent) of the population being urban-based in just two decades, Table 2.3.

Leading causes of infant mortality and over-all morbidity reflect the nature of epidemiological change in the country; which is peculiar to middle-income earning economies (Frenk, 1989). Pneumonia, diarrhoea and respiratory conditions rank high as causes of infant mortality (Table 2.4). These health problems relate to conditions

Table 2.3
Basic Demographic Information

Population, 1990 /a	60,703,000		
Crude Birth Rates /b			% Change
	1980	37.3	
	1990	28.8	-20%
Crude Death Rates			Age-Stndrdize
	1970	9.7	10.2
	1980	8.5	8.5
	1990	7.4	7.5
Age Distribution of Population /c			
Less than 15 years old		39.3	
15-64 years old		56.8	
65 years and older		3.9	
Median Age		20.1	
% of Population Urban /b			
	1970	31.8	
	1980	37.3	
	1990	48.6	
Population Density 1990 202 persons/sq.km.			

a/ Philippine Statistical Yearbook, 1993

b/ Fleiger, 1994

c/National Demographic Survey, 1993

Table 2.4
Infant Mortality, Ten Leading Causes
Rate Per 1,000 Live Births

	(1981-1985) Average	(1985 - 1989) Average	1990
1. Pneumonia	10.2	8.7	5.8
2. Respiratory Conditions	5.5	4.3	3.7
3. Diarrhoea	3.6	2.1	1.1
4. Congenital Anomalies	1.9	1.5	1.3
5. Avitaminoses	1.7	1.3	0.7
6. Measles	1.3	1.1	0.4
7. Birth Injury & Difficult Labor	1.1	0.9	0.7
8. Acute Bronchitis	0.7	0.5	0.3
9. Septicemia	0.6	0.7	0.9
10. Meningitis	0.5	0.4	0.3

Source: Philippine Statistical Yearbook, 1989, 1993

of living and health service capacity. Morbidity causes (Table 2.5), on the other hand, are dominated by bronchitis and diarrhoea, again problems related to conditions of living. A rise in accidents, malignant neoplasms and diseases of the heart is also discernable. The health conditions in the country reflect the co-existence of widespread poverty with 'islands of wealth'. Health services, therefore, have to respond to problems related to socio-economic conditions, through basic public health activities, and at the same time, deal with a growing demands for personal, technology-intensive care for chronic diseases (Evans, 1982).

2.1.2 The Pattern of Growth Pursued

Differences in growth strategy and other factors may partly explain the pattern of these health and socio-economic trends (Boyce, 1993). For example, while the Asian countries cited pursued export-led growth, for most of the sixties and early seventies, the Philippines clung to import substitution policies of the 50s. One aspect of the economic growth process that stands out for the Philippines is that much of its growth in the 70s was pursued through external borrowings. From a debt of US $ 360 million ($1.1 billion in 1986 prices), the country's external debt rose to $28.3 billion; making the Philippines one of the heaviest indebted country in the world. In terms of debt-to-GNP ratio, the Philippines had the highest at .90 (Boyce, 1993). The strategy of external borrowing was vigorously pursued by the autocratic regime which controlled the country from 1972 to 1986. The external flows supported programmes and monopolies closely associated with the ruling family. The world economic downturn in the 80s and the political turmoil following the assassination of a leading opposition politician, saw foreign loans dwindling and with them, political support for the regime (Hutchison, 1993). The democratic regime that followed, including the

Table 2.5
Morbidity, Ten Leading Causes
Rate Per 100,000 Population

	(1981-1985) Average	(1985-1989) Average	1990
1. Bronchitis	798.5	1215.0	1580.3
2. Diarrhea	764.8	1080.0	1520.7
3. Influenza	616.9	938.0	878.0
4. Pneumonias	289.1	353.0	380.3
5. Tuberculosis	244.2	301.1	246.1
6. Malaria	141.9	211.6	118.7
7. Accidents	168.1	201.5	215.5
8. Measles	94.2	119.8	69.2
9. Malignant Neoplasms	48.4	49.2	54.3
10. Diseases of the Heart	130.6	140.5	160.7

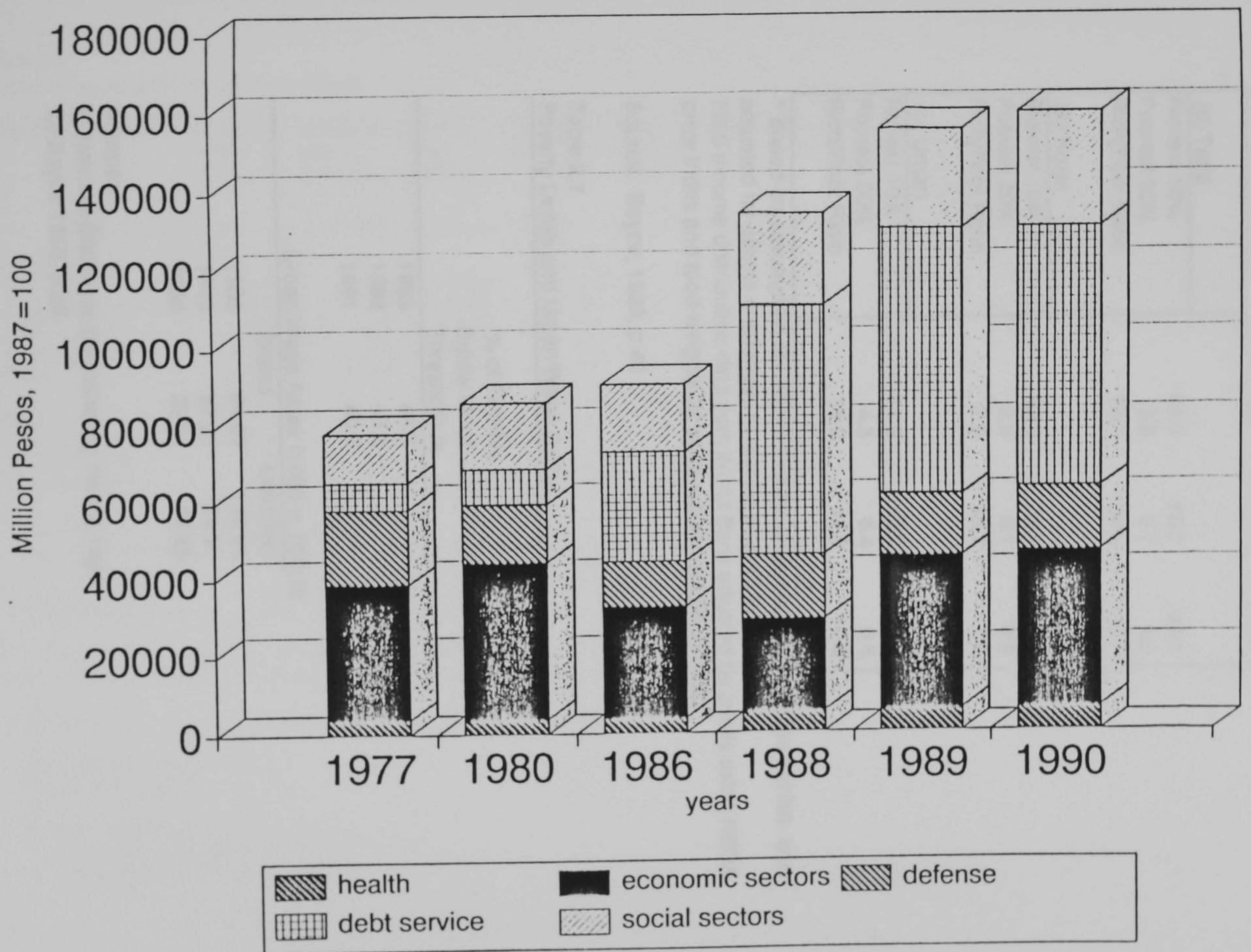
Source: Philippine Statistical Yearbook, 1989/ 1993

present administration, still operated under an International Monetary Fund (IMF) programme which indicated that external borrowings remained in place. However, structural adjustment programmes have been instituted to enhance debt repayment. These programmes, relying on tight monetary and fiscal policies to control prices, have caused concerns especially in terms of heightening poverty and inequality in the country. Figure 2.2 shows how debt servicing gets at least a 30 percent share of the national budget, bigger than the combined shares of other sectors, such as social services, including health. Income inequality in the Philippines is considered to be one of the highest in the world. Table 2.6 shows that improvements in shares of income going to the poorest 30 percent have barely moved: they have only a 10 percent share of income. Although wide fluctuations have been felt by the richest 10 percent, they still control nearly half of the country's income. It is this trend in income inequality which has created the general impression that the Philippines mirrors the growth path of Latin American countries rather than that of East Asian countries (Boyce, 1993; citing World Bank, 1985).

Table 2.7 shows that in terms of government-defined poverty threshold, the proportion of the population who are considered poor has remained at around 40 percent, despite slight improvements. The declining trend in urban wage rates, with 1985 rates only a third of rates in 1965, in real terms, indicates the worsening economic conditions in the country.

In terms of regional conditions, the inequality in incomes finds a parallel in the inequality of economic growth and performance across the 14 regions of the country (Table 2.8). More than half of the population, or 55 percent, live in the Luzon

Fig. 2.2 : Gov't Budget Allocations
By Sectors



Source: NEDA, Social Development Staff

Reference: Solon, et al., 1991

Table 2.6
Trends in Real Income Distribution, 1961-1985
(thousand pesos, 1978=100)

	1961	1971	1985
(a) Total			
Richest 10%	42.9	56.7	46.1
Poorest 30%	3.3	3.7	4.6
Rich/Poor Ratio	13.1	15.2	10.1
(b) Rural			
Richest 10%	22.3	39.6	28.2
Poorest 30%	2.8	3.1	3.8
Rich/Poor Ratio	7.9	12.7	7.5
(c) Urban			
Rchest 10%	71.2	82.7	67.9
Poorest 30%	4.5	6.4	6.6
Rich/Poor Ratio	16.0	12.9	10.3

* Based on assumption of uniform income understatement across deciles and adjusted for effects of changes in relative price of food.
FIES income distribution data from World Bank adjusted by prices using NEDA price index and food weights for price adjustments from NSO

Source: Boyce, 1993, p.40

Table 2.7
Poverty Levels and Urban Wage Rates

	% of Families Below Gov't Threshold /a
1985	44.2
1988	40.2
1991	40.7

	Urban Wage Rates (1986 = 100) /b	
	Skilled	Unksilled
1965	84.07	112.94
1975	57.27	68.31
1985	23.21	35.55

Sources:
a/ National Statistical Coordinating Board, 1994
b/ Boyce 1993, p.28

Table 2.8
Economic Development Indicators Across Regions

Island Groups / Regions	Population 1990 ('000)	%Share of Total Population	GRDP /a 1992 (mil Peso)	% Share of GRDP	GRDP Per Capita (in US $) /b	% of Families Below Poverty Line, 1991	Labor Force Participation Rate 1992	Infant Mortality Rate /1000 live births 5-Year Ave. ('85-'90)
A. Luzon								
1. Ilocos	3,551	5.9	29,265	2.2	317	49.4	52.8	47
2. Cagayan Valley	2,341	3.9	27,276	2.0	448	43.1	61.2	67
3. Central Luzon	6,199	10.2	134,944	10.1	837	33.0	52.6	39
4. Southern Tagalog	8,264	13.6	195,562	14.6	910	38.0	54.8	42
5. Bicol	3,910	6.4	37,864	2.8	372	56.1	59.2	55
B. Visayas								
6. Western Visayas	5,392	8.9	92,959	6.9	663	46.7	57.1	55
7. Eastern Visayas	4,593	7.6	85,317	6.4	714	42.4	57.4	51
8. Central Visayas	3,055	5.0	34,383	2.6	433	40.7	58.3	43
C. Mindanao								
9. Northern Mindanao	3,158	5.2	37,422	2.8	456	54.5	53	101
10. Central Mindanao	3,510	5.8	63,995	4.8	701	55.2	60.4	79
11. Western Mindanao	4,459	7.4	90,374	6.7	780	47.5	59.5	86
12. Southern Mindanao	3,171	5.2	45,074	3.4	547	51.0	63.5	102
Cordillera Region	1,146	1.9	23,403	1.7	785	37.6	60.4	63
Metropolitan Manila/NCR	7,928	13.1	434,792	32.4	2,109	14.9	53.3	36
Total, Philippines	60,677	100.0	1,342,630	100.0	851	40.7	56.2	53

a/ Gross Regional Domestic Product
b/ 26 pesos to 1 US dollar

Sources: Philippine Statistical Yearbook, 1993
Poverty Incidence: NSCB as reported in UNDP, 1994
IMR: NSO, Population Studies Div., reported in Solon, et al., 1991

islands, 21 percent in the Visayas and 24 percent are found in Mindanao. In terms of income, the NCR and nearby regions 3 (Central Luzon) and 4 (Southern Tagalog), as premiere industrial areas, hold the bulk of the nation's income. They are advantaged in terms of location and have been primary recipients of infrastructure and development efforts in the past. Mindanao, on the other hand, holds the next highest share of income; situated as it is in an area almost free from typhoons which makes its agriculture a valuable source of employment and income for the country. However, a long history of civil and ethnic unrest in the Moslem areas, and government neglect, has held back its economic progress. Labour force participation rates in the non-industrial regions were higher than the national average, reflecting a pattern of uneven development. Regional patterns in infant mortality rates also show the better off region, the National Capital Region, having infant mortality rates which are 2.8 times better than the worst off region in the country, Region 12 (Southern Mindanao).

2.2 The Organization of Philippine Institutions and Dynamics

The inequalities in health status and the economy in general, are somehow rooted in the patterns of trade and the concomitant ownership structures that were fostered in the colonial period and have endured to the present (De Dios, et.al., 1993). This section provides a brief overview of Philippine institutions to serve as a backdrop to the analysis of the regulatory framework.

Social Organization. The Philippines has undergone long periods of colonialism, first under Spain, for more than three centuries, then under the United States of America, for 45 years at the turn of the 20th century. Colonialism, particularly the twin influences of Catholicism (from Spain) and libertarian ideals from

the U.S., has engendered a social organization, which Kuitenbrouwer(1979) aptly describes as follows:

> ...The view grows that poverty is inevitable, that resignation to the will of God is a virtue, and that it is the task of the rich to have compassion and to help the poor whenever poverty becomes manifest...Welfare is entrusted to the church and to that organization that it inspires. Privatization of the social welfare function grew during the American period in which individual responsibility of the citizens was emphasized, in (natural) correspondence with the ideal of individual freedom and initiative. Thus, social welfare is increasingly perceived, not as a responsibility of the organized community as a whole, but as the task of private groups of citizens, whether religiously or otherwise inspired (p.2).

The social orientation therefore, along with other aspects of Philippine life, is one of emphasis on private initiative; with heavy reliance on personalistic and kinship in social relations. This reflects on the strong private sector orientation in the economy. The behaviour of this sector can be understood in the context of the political framework.

Political Organization. The colonial trade in primary agricultural goods has encouraged ownership of large farms, which created an agrarian elite and a strong patronage system(ILO, 1976). The rigid class structure created, based on control of land, survived through the industrialization process as the political institutions and processes served elite interests well. U.S. democratic institutions, separating powers among three branches of government, are in place. The competition for control over the executive or presidential power and a bi-cameral legislature drawn from provincial and national representatives, takes place through elections decided on simple majority or plurality votes. The judiciary is expected to provide the checks-and-balances function; although all appointments to the judicial positions are made by the President.

The Philippines has undergone two major political changes in recent times. It was under martial law for 16 years, which saw executive and legislative powers vested in one-man. A strong executive served to create a small elite group which controlled large investments and external flows in major areas in agriculture and industry.

The prominence of non-elite participation in a 'people's power revolution' that toppled the dictatorship heralded a new phase in Philippine life. The aversion to a strong executive led to the decentralization of powers to the representatives/ legislators and increased powers and resources, as well as responsibilities, to local governments (de Guzman, 1988; cited in Hutchison, 1993) While legislative powers are effective in limiting executive prerogatives in the national budget and enhancing accountability of line agencies, they are far-reaching in terms of granting franchises, and blocking entry into new areas of investments. However, the new electoral democracy brought back the shifting alliances characteristic of a system where a patronage continues to prevail (Esfahani, 1994). New players did not eliminate the partisan and/or personal politics that permeate every government decision. It just served to intensify political brokering; making political processes highly "entrepreneurial". Elections, as the manner through which competitive politics are waged, serve as contests of personalities and influence, backed by money.

Economic Organization. The modern economic growth process in the Philippines was initiated by a free trade regime between the U.S. and the Philippines even after independence. This, however, served to create the first of the series of balance of payments crises, as exports outpaced imports, a phenomenon prevailing to the present. The main beneficiaries of this period were the agricultural landowners who enjoyed free access to the U.S. market.

This process was followed by an import substitution phase, a pattern similar to that in much of the developing world. Import substitution industrialization (ISI) was generally seen as a response to the declining terms of trade which served to impoverish much of the developing world relying on primary agricultural exports (Gillis, et al, 1991). With import substitution policies, domestic industries were protected by high tariffs and quotas, and the imposition of import and exchange controls. The policy has nurtured a new class of domestic manufacturing elites and led to distortions in the economy arising from the maintenance of an overvalued currency. This has heightened the balance of payments problems and increased reliance on foreign debt (De Dios, 1993).

The economic pattern, under the prevailing political system, has engendered a unique feature of behaviour amongst Philippine elites, one which a foreign observer described as follows (Esfahani, 1994):

> Though there were no prohibitions against state ownership, economic assets remained largely private. Public ownership of an enterprise meant the total loss of the associated surplus once the ruling group was out of power. Turning an enterprise into the group members' private property, in contrast, could help maintain the group's control over the assets and at least part of the returns. Thus many foreign-owned enterprises were "Philippinized" but not nationalized, as similar enterprises in other developing countries had been. ..on occasions when enterprises of rival groups could be expropriated or when failing domestic firms fell into government hands, the ruling coalition arranged for its members to purchase the enterprises and secure them as their property...to maintain control of political and economic rents, the Philippine elite have helped shape a political structure that has stunted the development of efficient institutions for market governance and resource mobilization"(p. 11-12).

This lack of efficient institutions has been exposed under, both strong and weak, state regimes. Social inequalities distort the mechanisms for the articulation of people's interests. The fundamental characteristic of inequalities in incomes and

economic opportunities translates into inadequacies in the entitlement system fostered by inefficient institutions in the Philippines (De Dios, 1993).

2.3 Implications for the Regulatory Framework in Health Care

2.3.1 Characteristics of the Regulatory Structure in Health Care

The Philippines has been described as one of the most politically advanced countries in the region because of its democratic traditions (Hutchison, 1993), effecting a resurgence again after nearly two decades of authoritarian rule. Under the Philippine system of institutions, described in section 2.2, the state allocative processes and regulatory framework are likely to reflect the disparities in Philippine life. The characteristics of the regulatory structure in the Philippines that impinge on the health sector are identified below.

Multiple Sources of Power. Given the nature of social relations and inequities in Philippine society, the presence of democratic institutions like elections, do not guarantee that revealed preferences in the public arena reflect the majority's preferences. All laws of the land emanate from the legislature. The members of the legislature and the President of the Republic of the Philippines are voted by direct vote. Voting by representatives in the legislative chambers is an outcome of a mix of elements reflecting the multiplicity of power sources: political party, constituency, interest groups, vote trading, and personal aggrandizement (Hutchison, 1993). Public choice literature highlights how, given the varying intensity of preferences among these varying pressure groups and elements, voting behaviour will likely lead to a level of provision that may be higher than the efficient level (Le Grand, 1991).

The executive can also determine outcomes through presidential veto. But this is rarely exercised. With weak ideological bases of Philippine party politics, the

extent to which the executive can be immune from pressures is determined by its personal control over the party. The legislature, on the other hand, has often used the judiciary to provide the final decision on legislations, even if they have reached the final signature of the President. The legislators themselves may often bring the matter to the Supreme Court after the law has been signed. This is a relatively new phenomena but one which has been used for the health laws cited earlier; i.e. the Generics Law and Decentralization. This serves to highlight the multiple sources of influence in Philippine society and indicates the weakness of regulatory institutions.

Lack of Independence of the Bureaucracy. Regulatory functions for the health sector are overseen by bureaux within the sectoral departments. These bureaux are headed by appointed officials who report to the Secretary of the Department who is also an appointed official. The Secretary's appointment is subject to the approval of the bi-cameral body in the legislature known as the Committee on Appointments. Political appointments at the top serve to weaken morale and independence in the bureaux. The consequence of this lack of independence is to heighten policy uncertainties and enforcement ambiguities. The leadership posts are subject to changes given shifting political alliances, executive discretion and congressional interference. This shifts the bulk of responsibilities for continuity, implementation and enforcement to the middle and lower levels of the hierarchy.

Lack of Control over Budgets and Personnel. The lack of independence is also heightened by congressional control of government budgets. Budgets of all government agencies are scrutinized and approved by the legislature. Tight and fluctuating budgets have affected bureaux efficiencies, providing further impetus for the legislature to control appropriations to the departments. The legislative control over

budgets provide legislators with a unique instrument of bureaucratic power; and bureaucratic energies become engaged in this bargaining. This power gives the representatives of the Congress undue influence on the manner in which regulatory agencies behave, creating tensions between the two bodies.

The hiring and firing of public personnel are constrained by civil service rules. While such policies are good for staff morale because of the tenure they provide, they also breeds inefficiencies through the lack of a disciplining element. The problem of staffing is further complicated by government restrictions on hiring. Frequent changes at the top and freeze hiring below breeds inertia. Given the uncertainties in leadership, routine activities are resorted to. Enforcement capabilities are affected by resource constraints. Limited staffing and inadequate equipment limits effective monitoring and evaluation

'Agency Creation'. One manifestation of the tension between legislature and the executive is the propensity by the legislature to create other bodies which take on similar functions to existing agencies. This is in addition to the tendencies of the legislators to mandate construction of new hospitals to serve their constituencies. Hospitals established by law cannot be closed except by another act of legislation. This constrains already limited public resources.

The Philippine Medical Care Commission (PMCC), the body which oversees the compulsory health insurance programme, was initially established by the legislature, separated from the Department of Health. Other quasi-government bodies (e.g. Philippine Tuberculosis Society), those with government funds but privately-managed, may be created with funds often taken out of the health budget. The picture of government expansion is not really one toward a monolithic or leviathan state

(Niskanen, 1968), but one of disintegration. Too many agencies, with functions overlapping, distract the main sectoral departments' attention. If it is seen to create some competition within the public sector, the pressure of limited resources transform bureaucratic energies towards 'turf-battles' rather than towards efficient performance.

Biases of Mandatory Restrictions. Bias towards restricted entry is the most common form of regulation. It is best exemplified by the licensing rules that apply to the entry of professionals to medical practice and/or employment. These licenses function mainly as a form of entry restriction, rather than quality restriction, in the sense that they certify only to educational qualifications and thereby serve as a minimum standard.

In so far as they specify tasks or restrict delegation and substitution, the specification of functions for each health professional, as embodied in the various laws, i.e. Nursing Act, Dental Act, etc., also serve to preserve professional domains. This is similar to the legal reservation of tasks in the British National Health Service as described by Green (1985). That these rules are not immutable and are subject to the political process was demonstrated recently in the Philippines in the legislative tussle between optometrists and ophthalmologists regarding the grant of rights to optometrists to prescribe or apply medication to patients (Rodriguez, et al., 1994). The case highlights increasing competition among professionals.

Minimum requirements for certificates or licenses to operate health care facilities, i.e. hospitals, clinics, diagnostic centres, laboratory services, etc., specify quality standards. Minimum standards for facilities are specified in terms of numbers and staffing combinations, type of equipment and instruments based on approved services it can offer, as well as physical facilities. Hospital facilities are categorized

as primary, secondary or tertiary on the basis of services offered. Primary hospitals, for example, can offer up to 25 beds and should have administrative, clinical and nursing services. The introduction of health care products and drugs are also subject to testing and regulations. Delays in processing of application (8 months to more than a year) are the subject of oft-repeated complaint (Rodriguez, et al., 1994). These regulations increase the cost of entry to a market and subject the regulators to pressures in the form of bribes.

2.3.3 Characteristics of Self-Regulation by Professionals

Professional regulation is as much an activity of medical professional groups as they are an activity of government. The medical profession, as one of those subject to entry regulations, are also entrusted with regulatory responsibilities by the state (Evans, 1984; Arrow, 1963). These responsibilities are intended to ensure and maintain quality. Quality-certifying groups are those which have *College* in their titles. Some professional groups call themselves 'societies' or 'associations'. The Philippine Medical Association (PMA) functions as a powerful lobby group akin to its American counterpart. All practising physicians are members of this group. In the Philippines, in addition to other regulations, self-regulation by providers have the following features.

Accreditation of Medical Schools. Self-regulation begins at the entry level in medical schools. There were 27 medical schools in the country in 1991, 23 of which are private (Rodriguez, et., 1994). Medical schools in the country have an accreditation process which imposes quotas on freshmen enrolment among member schools. School accreditation is a quality signal. The voluntary grouping of medical school administrators and owners is recognized by both DOH and Department of

Education, Culture and Sports (DECS). The relationship is symbiotic in the sense that medical schools can be closed upon the group's recommendation and that tuition fees for accredited schools are less subject to government fee controls. Education in the Philippines is largely funded by family sources. State education is subsidized. Any restrictions on entry to medical schools and training result in higher costs of medical education.

Certification of Professionals. The certification process is three-pronged. First, the Board or College designates a member to the Board of Examiners which conduct the professional exams. Second, specialty training programs are designed and approved. Places for specialty training are limited and restricted to teaching hospitals. Trainees are known as residents in these hospitals and are paid a salary or allowance. Third, further specialization or fellowship requires additional years of training, in a smaller number of hospitals, at the end of which oral and written examinations are conducted. This pattern is similar to that in the United States as discussed in Phelps (1992). Repeat examinations may also be required and more and more specialties require continuing medical education (CME). These educational units are also required for license renewal.

Restrictions on Conduct of Practice. Self-regulatory or professional rules influence the conduct of practice. Mandatory restrictions cited above have been imposed, often at the behest of the professional groups. Access to hospitals hinges on membership in collegial bodies. Self-regulation also defines the functions of personnel and impose strict restrictions on the substitutability of personnel functions. Professionals are also restricted from advertising.

2.4. Implications for Government Service Provision

The nature of the development of Philippine institutions and the regulatory framework engendered by these institutions, determine the orientation and organization of public health service delivery. The extent of this influence can help explain the pattern of health development, discussed in Section 2.1, in the country. Health service goals and the organization of the public health care system reflect the general orientation of Philippine society. Budgetary allocations, on the other hand, reflect the priorities of the public health sector.

2.4.1 Health Sector Goals and Objectives

The 1988 Constitution of the Philippines serves as the organizing framework of the laws of the land. With reference to health, the constitutional mandate for state institutions is:

> ... to protect and promote the right to health of the people and instill health consciousness among them (Article II, Sec. 15, The Philippine Constitution).

The sections on social justice and human rights also commit the government in the following manner:

> The State shall adopt an integrated and comprehensive approach to health development which shall endeavour to make *essential* goods, health and social services available to all the people at *affordable cost*. There shall be priority to the needs of women and children. The State shall endeavour to provide *free medical care to paupers* (Article XIII, Section 11); (emphasis mine).

The emphasis on *essential goods and services* reflects a libertarian view of minimum provision consistent with the private nature of social and economic organization in the country. Health care needs beyond the minimum are assumed to be satisfied outside state provision. In addition, state services should be affordable; while free care is enjoined for the paupers or destitute people. Considerations of costs

and affordability, even as it attempts to guarantee the basic right to health, reflects the recognition of the limits of state provision.

The policy objectives of the present Department of Health are expressed in a policy document, Health in the Hands of the People (DOH, 1992). It contains a strong commitment to primary health care as a basic strategy, with emphasis on preventive and promotive health programmes. It calls for an integration and promotion of individual and collective responsibility for health, self-reliance, preventive actions, the status of women, environmental sanitation and workers' safety. To quote from the handbook:

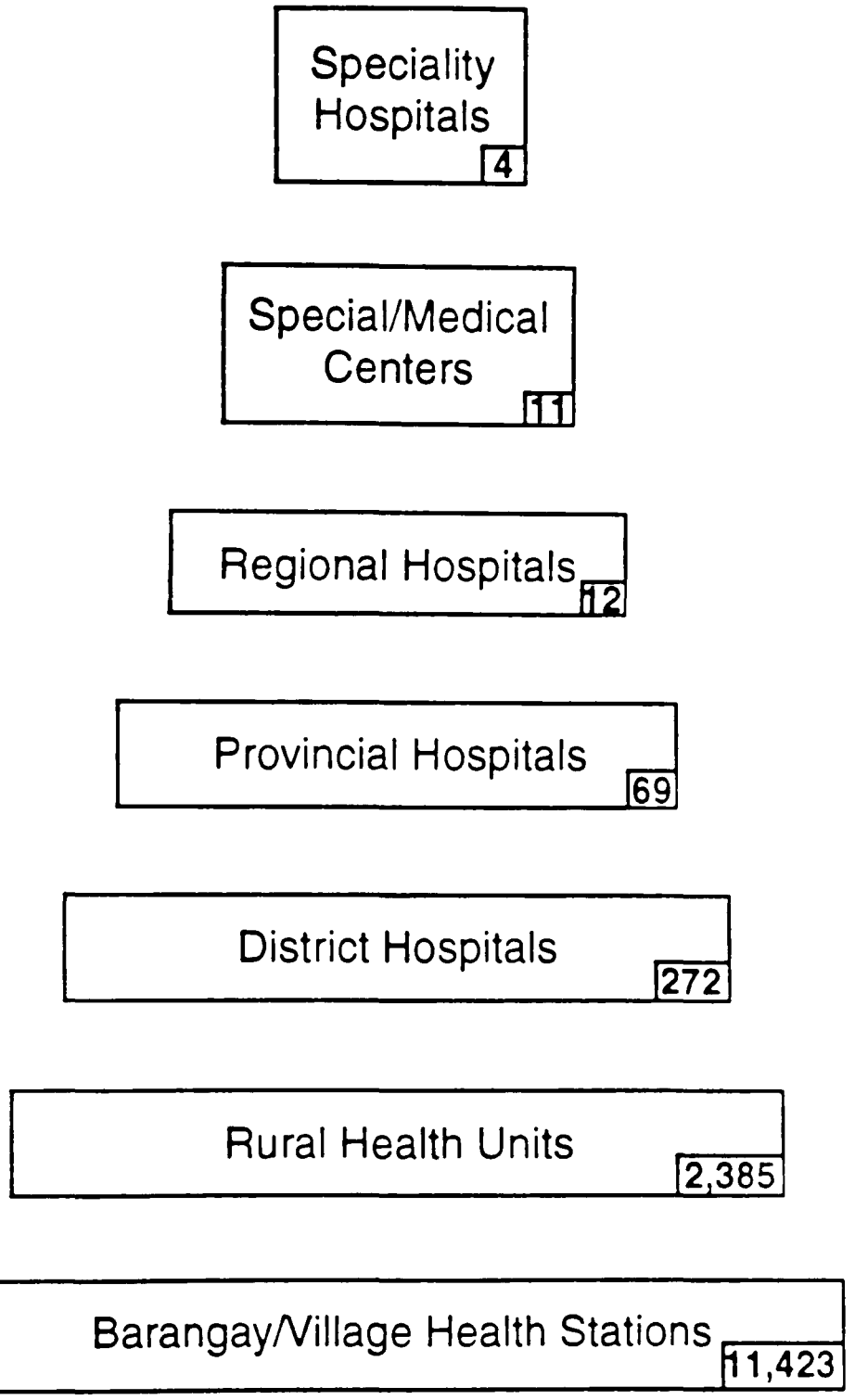
> For health to be in the hands of the people, the people must attain effective control over the decisions affecting their health. In this regard, people empowerment is an essential element of health improvements. The DOH shall seek to transform health care from its presently "doctor-centered" character to an increasingly "people-centered" orientation. Every *individual shall be responsible for his health*, and shall exercise the *means* for promoting and protecting health through participation in the community, organizations, institutions and government. This is people empowerment and popular participation in health (p.2).

The emphasis on individual or community self-reliance highlights an orientation of weak state commitment. It implies that health seeking behaviour is largely considered a private matter and the responsibility for the delivery of health care falls on the private sector, which includes not only individuals but private firms, professionals, religious and other organized groups.

2.4.2 The Organization of the Public Health Service Delivery

The delivery of basic health services has long been the traditional role of the Department of Health. It has an extensive network of health services operating in a pyramidal referral system (Figure 2.3). At the base are village/barangay health

Figure 2.3
Public Health Services Hierarchy



Source: County Health Information Profile: WHO/WPRO/HN, 1988
RHU/BHS, PhilippineStatistical Yearbook, 1993
Speciality Hospitals, Lanuza and Manalo (1994)

stations(BHS), performing largely promotive and preventive functions through midwives and volunteer paramedics. In 1992, there were some 11,423 BHS spread throughout the country. The frontline personnel are supervised by the Rural Health Nurse (RHN) at the rural health units (RHUs), the second tier of referral. RHUs can provide more curative care as the staff are supervised by a physician. There were approximately 2,385 RHUs in 1992. The BHS and RHUs comprise the public health field services. The ratio of these units to the population is one facility for every 4,400 people.

District and provincial hospitals providing secondary level care, having an average of 25-50 beds and 100 -150 beds, respectively, form the next referral tier. District hospitals may cover more than one municipality. And the head of the district hospital serves as the supervisor of the rural health units.

More difficult cases are passed on to the regional hospitals of which there are 12. These facilities have authorized bed capacities of approximately 200 - 500. From the regions, a small number of special/medical centres (250 beds or more) provide specialist care and are mostly found in the National Capital Region. Funding for these medical centres are directly appropriated from the health budget. At the apex of the public health system are the four specialty hospitals specializing in heart, kidney, lung and children's diseases. The four specialty hospitals are associated with the martial law regime, having been set-up during their waning years. Efforts to privatize these hospitals have not taken-off. These hospitals are managed as a government corporation and run by Boards of Trustees, with the Department of Health appointing a representative to these boards.

While the referral system looks neat on paper, operationally, and in practice, people often by-pass the lower levels and proceed directly to hospitals for consultations. Table 2.9 shows the leading causes of discharges in government hospitals. There is very little difference in cases seen in primary hospitals and tertiary hospitals. This seems to reflect the inefficiency of the public health system through the failure of the referral system to function; as hospitals appear to be treating cases that can be seen at lower levels, assuming that severity levels are similar. This may be partly due to the shortage of resources at lower levels given the low budget allocations to field services. A similar observation was made for Kenya (Mwabu, 1989). Mwabu, for example, noted that the over-crowding in hospital facilities was a result of the failure of the referral system as well as the underpricing of hospital services.

The Decentralization Law of 1991 severs the DOH from control of health services below the regional levels. The extent of devolution in the country, which involved wholesale transfer of assets and facilities as well as budgetary allocations and administrative control, does not appear to be mirrored in other country experiences documented in Mills, et al. (1990). The transfer of district level facilities down to the primary care units to the local authorities have raised concerns strong enough to bring forward bills in Congress asking for an exemption of the health sector from devolution. The pressure comes from the two principal stakeholders: health workers and local authorities. Health workers are wont to be under local authorities; and local authorities find health sector demands, particularly wages, to be too high. Health workers are protected by the Magna Carta for Health Workers, a legislation, which give benefits, among others, monetary allowances to health workers which are not

Table 2.9
Leading Causes of Discharges, 1990
Public Hospitals, By Levels

Primary	%	Secondary	%	Tertiary	%
1. Acute Gastro-enteritis	31.8	1. Acute Gastro-Enteritis	30.8	1. Deliveries	40.2
2. Pneumonia	14.9	2. Deliveries	15.0	2. Acute Gastro-Enteritis	14.2
3. Bronchitis	13.4	3. Bronchitis	12.3	3. Pneumonia	13.2
4. Amoebiasis	7.9	4. Pneumonia	11.9	4. Obstetrics-Gyne Case	7.9
5. Malaria	7.4	5. Urinary Tract Infection	7.3	5. Kochs/Pulm. Tubercu	6.3
6. Influenza	5.6	6. Malaria	5.6	6. Urinary Tract Infection	4.8
7. Measles	5.4	7. Tuberculosis	4.7	7. Bronchitis	3.7
8. Urinary Tract Infection	5.2	8. Obstetrics-Gyne Cases	4.2	8. Newborn	3.5
9. Deliveries	5.1	9. Upper Respiratory Tract Inf.	4.2	9. Appendicitis	3.4
10. Hypertension	3.4	10. Gastritis	4.1	10. Measles	2.7
	100		100		100

Source: DOH, HOMS

Reference: E. Gorra, 1993. Background Paper, Strategic Planning Workshop for Hospitals

allotted to other public servants. Local authority resources are also uneven such that some hospital budgets may exceed the local government's own operating budgets.

2.4.3 Budgetary Allocations

Viewed from the constitutional mandates, the justification for public involvement in the health sector is to address the health needs, particularly of disadvantaged groups. Budgetary allocations reflect the Department of Health's priorities. Government allocations to the health sector are passed through and approved, along with the other expenses of government, in the legislature. Figure 2.4 compares the pattern of regional public expenditures before the devolution with the infant mortality rates. The table ranks the regions, from the lowest per capita public expenditures (Region 12: Southern Mindanao) to the highest (NCR). The lowest per capita spending is 20 percent that of the NCR per capita spending. NCR allocations are nearly 3.0 times the average per capita public spending. The regions with the lowest per capita public spending are also those with the highest infant mortality rates, reflecting an inequitable pattern of resource allocation.

Allocations between preventive/public health activities and curative/hospital-based services reflect the health service delivery bias. Table 2.10 shows that an average of 66 percent of DOH allocations are taken-up by curative or hospital care. However, as we have shown above, the dichotomy between preventive and curative is tenuous when one examines the type of complaints that reach government hospitals in the country.

Within the DOH, the allocation process is divided up into: Central Office/Office of the Secretary, regions, regulatory bodies, special hospitals. Table 2.11 shows that 75 percent of DOH expenditures go to the regional or field offices; while

Fig. 2.4: Per capita Health Budget Allocations Vs. Infant Mortality Rates

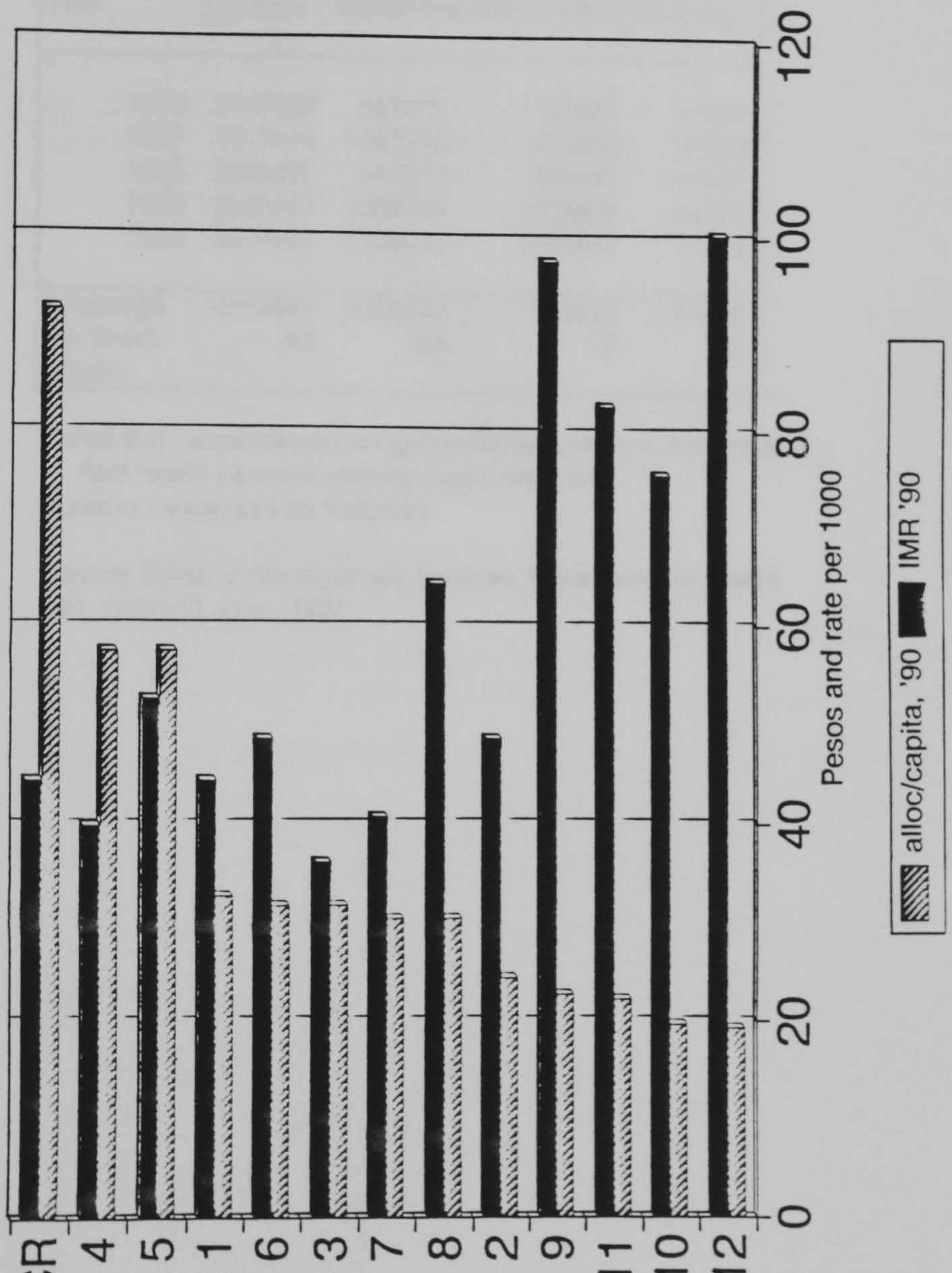


Table 2.10
Health Budget Allocation, Department of Health
(in 000 pesos, 1987 prices)

Year	Curative	Preventive	Administrative	Training
1986	2411862	887470	197302	41254
1987	2917678	1087675	202820	35544
1988	3529000	967902	332846	47467
1989	3582087	1262788	1062230	55977
1990	3629627	1108978	1068934	77283
5-Average	3214051	1062963	572826	51505
% Share (Ave.)	66	22	12	1

Preventive - expenses for drugs/medicines,radiation, hazard/risks field health services, primary health care, etc.
Curative - expenses for hospitals

Source: Office of Management Services, Department of Health
Ref.: Solon O, et.al., 1991

Table 2.11
Department of Health Expenditures
By Major Services

Services (1988=100)	1988 - 1991 in thousand pesos	Percent Share
Office of the Secretary	499,972	9.4
Regional Health Offices	3,996,001	75.3
Regulatory Bodies	30,848	0.6
Special Hospitals (11)	652,282	12.3
Specialty Hospitals (4)	128,887	2.4
Total	5,307,989	100.0

Office of Secretary - Central office expenses
Regional Health Offices - includes all allocations to field offices
Regulatory Bodies - Dangerous Drugs Board, Phil. Medical Care Commission
Special Hospitals - i.e.medical centres; includes RITM
Special Hospitals - Heart, Kidney, Lung, Children's

Source: Lanuza and Manalo, 1994

the combined budget for NCR-based hospitals exceed the budget of the Central Office of the Secretary. The 11 special hospitals received about 60 million pesos each, while the each specialty hospitals had 32 million pesos. The imbalance might be due to the fact that the four specialty hospitals have other sources of income, particularly through renting out of parts of its buildings. These four hospitals are relatively new and as corporation, or trusts, they have official capacities to raise their own resources in addition to their allocations from government.

The lowest percentage share (at less than one percent) of the expenses go to the regulatory bodies, the Dangerous Drugs Board and the Philippine Medical Care Commission (PMCC), the policy-making body for the compulsory insurance programme. And Lanuza and Manalo (1994) observed that while the shares of these bodies increased between 1988-1990, the 8.1 percent increase in expenditures was negated by an 8.74 decline in 1990-1991. Within the DOH, the budget for the Bureau of Licensing and Regulation(BLR), the office handling hospitals has been reported to have been declining in real terms, from 3.4 million pesos in 1988 to 2.5 million pesos in 1991; a decline of about 25 percent. Expenses for personnel comprised 77 percent of the BLR budget (Rodriguez, et al., 1994).

While the DOH traditional regulatory role, as per the functions of BLR, are largely directed towards enforcement of standards in hospital facilities, there are also regulatory functions which reflect equity concerns. The DOH is also required to allocate some funds for the purchase of care in private hospitals in areas where there are no existing facilities. These regulations are enforced through subsidies. In the DOH budget, there are five mandated subsidy programmes which were mandated by law: a) equipment subsidy for payment of diagnostic services obtained by indigent

patients from private facilities; b) bed subsidy for payment of indigent patient care in private facilities; c) stipends for rural health practice programme which fields out new graduates to underserved areas; d) aid to puericulture centres which are akin to first aid posts located in village halls; and e) aid to the Philippine Tuberculosis Society, a quasi-government body established by legislation. The first two allocations are applicable only in areas with no public facilities. However, budget allocations to these programmes ranged from .0001 percent for equipment subsidy and .0009 percent for aid to puericulture centres in 1990 (Solon, et al, 1991). These programmes receive nearly fixed budgets which are not adjusted for inflation.

Table 2.12 shows that although field or regional offices get the largest share of the DOH expenditures, most of these services are still likely to be dominated by curative services. This may be attributable to the fact that the delivery system has large fixed cost components in the form of facilities, and equipment. Given civil service rules, government personnel may be considered as fixed or quasi-fixed inputs. Lanuza and Manalo (1994) delineated DOH expenditures and found out that on the whole, public health services or services with known large externalities, i.e. immunization, health education and information, etc., only comprise 11.5 percent of DOH expenses. Non-facility based public health services are not capital intensive and would therefore claim a smaller budget share.

Moreover, the quality of public facilities have been decried. A World Bank study (1994) reported that 18 percent of public hospitals are run-down and perennially face shortage of equipment, supplies and staff.

Table 2.12
Department of Health Expenditures by
Service Orientation

Services (1988=100)	1988 - 1991 in thousand pesos	Percent Share
Personal Care Services /a	3,490,011	77.1
Public Health Services /b	522,900	11.5
Gen. Administrative Services /	236,229	5.2
Unclassifiable	278,629	6.2
Total /d	4,527,769	100.0

a/PCS - services with zero or nil positive externality effects, i.e. treatment
b/PHS - services with large externalities, i.e. imunization,including support services, vector control, information, education and training, research
c/General Administrative Services - purely administrative expenditures of non-health facility based offices; i.e. central offices, regional administrative services, regulatory bodies
d/Excludes expenses for medical centres and special hospitals

Adapted from: Lanuza and Manalo, 1994

The pattern of public allocations for health services and regulations reflects the limited government capacity to fulfil its functions as mandated by the Philippine Constitution. Minimum state provision is characterised by operational inefficiencies in which the bulk of resources go the expensive curative facilities that deal with health needs that are preventable in nature. It is likely that the patients follow the flow of resources which result in inefficiencies since lower level facilities are cheaper than higher level care. The pattern of allocation also indicates that the DOH is more heavily involved in service delivery than with monitoring and other regulatory functions. The extent to which devolution will reform this imbalance in delivery and other functions remains to be seen. But the neglect of the government's oversight role, i.e. monitoring and regulatory, in the health care market is likely to engender private sector opportunism.

2.5 Conclusions

This background presentation on the Philippines and the regulatory framework of the health sector, highlights the nature of interaction among institutions and economic agents. The capture of institutions in the Philippines by powerful groups have fostered a weak regulatory agency in health care. Social, economic and political dynamics have served to enhanced the role of the private sector, including professional groups, in health care. The private orientation towards provision and financing of health care in Philippine society, therefore, raises concern regarding the access of those who cannot afford basic minimum care.

Public sector delivery of services have put the DOH, as a provider of care, amidst a strong private sector it is supposed to regulate. With the coexistence of public and private facilities, comparisons are naturally made. Thus, its credibility as a

regulator is affected by the quality of public services. Government regulations have an effect on the market structure in health care. The extent to which problems of weak state regulation are overcome by strong voluntary regulation, by the professional groups, can determine the nature of the market and its responsiveness to market signals.

Limited resources, on the other hand, have increased pressure on government facilities to collect fees. The introduction of prices in the government sector requires information on the structure of health care demand. The extent to which different income groups will respond differently to user fees in government facilities determines the equity impact of such policies.

Health sector outcomes in the Philippines are likely to be influenced by the nature of the development of its institutions and the behaviour of health care agents. An assessment of the performance of the health sector, particularly in terms of household and institutional financing of health care, is made in the next chapter.

Chapter Three

The Conditions of the Financing of Health Care in the Philippines

3.1 Introduction

This chapter describes the different sources of financing health care in the country and assesses the efficiency and equity of the different financing sources. The chapter is divided into three parts. The first part presents the different sources of financing health care and compares the pattern of health care spending in other Asian countries with their performance in terms of some health indicators. The equity of the financing system is examined in the second part, in terms of the pattern of household health status and health care spending, illustrated through concentration curves. A descriptive analysis of the ability of the insurance sources of financing to provide wider coverage of the population, share the burden of financial risks due to illness, and influence the behaviour of providers and health service firms is examined in the third part of the chapter.

The next sub-sections examine the issues that affect the performance of the health financing system, inorder to consider how health care financing affects the organization and structure of the health care market. This section ends with a discussion of the data used in the analysis.

3.1.1 A Review of the Issues

The financing of health care forms the nexus of exchange among economic agents in the sector. The financing mechanism, in so far as money flows generate the services consumed and provided in the health sector, determines the organization of care, as well as its efficiency and equity. The financial arrangements define the

variations in health care systems and its outcomes (OECD, 1992). The dominance of state financing characterises the health sector in many Western European countries (OECD, 1992). In these economies, state financing and provision of care are often integrated in the delivery of certain services, such as in hospital care (Donaldson and Gerard, 1993). Mixed sources of finance characterise many Asian and Latin American economies (Griffin, 1991; WHO-PAHO, 1989). Private financing, through insurance funds, allows care to be obtained from state or private facilities. Or, as in the case of health maintenance organizations (HMOs) in the United States, private financing integrates with provision. The existence of other arrangements combining state financing with private provision, or private financing for state provision, highlights the importance of financing for the organization and provision of care.

The incentives provided by the sources of finance for the organization of care arise from the payment mechanisms to providers of care, either as firms or as individuals (in the case of self-employed physicians). Direct payments from households comprise one of the most common forms of provider payment. It is found even in countries where there are official restrictions on private services (Newbrander and Parker, 1992). Estimates show that households spend between two and five percent of their incomes on health care (World Bank, 1989). Direct payments by households are thus dependent on ability to pay (OECD, 1992). A lack of paying capacity therefore implies that certain vulnerable groups will not receive care. Moreover, the absence of information on prices and quality of providers, as well as asymmetries in knowledge between physicians and providers, is also expected to make direct consumer choices inefficient (OECD, Ibid.). This chapter combines household expenditure for health care with self-reported health needs to examine the extent of

equity or inequity of household payments for health services. The efficiency of out-of-pocket payments by household is examined, in terms of household expenditure on health care goods and services.

Fee-for-service payments, on the other hand, made under the auspices of an insurance scheme, provide incentives for health care agents to increase the utilization of services and procedures covered in the insurance plan. Various reviews of insurance payments systems (WHO, 1991; Abel-Smith, 1992; Kutzin and Barnum, 1992; Barnum, et al., 1995) cite this form of paying providers as most inefficient and inequitable. The extent to which this is so in the Philippines, given that this is the prevailing form of paying providers by the largest institutional funder for health care, the compulsory insurance scheme or Medicare, is examined in the third part of this chapter.

Moreover, the manner of reimbursing providers based on retrospective billing reflects the strength of the medical professions (Abel-Smith, 1992). Since the reimbursement system pays for services rendered at agreed rates, providers are assured of payments. Such payment system requires substantial investments in technology to generate system-side information and auditing of claims. Without such investments, the financing system creates an incentive for boundless opportunism (Ibid.). This issue is examined in the last section of this chapter. A case study on an alternative form of paying providers through the compulsory health insurance programme is presented to highlight the nature of costs and inefficiencies in the financing system.

3.1.2 Data Used

The data used in this chapter are from official and published secondary sources. The way official data sources were organized to yield the equity estimates in the next

section is unique to the study. The first official source of data used was the National Health Survey (NHS) of 1987. The NHS 1987 was a rider to the 1987 third quarter Labor Force Survey - Integrated Survey of Households (LFS-ISH). The NHS provides information on reported morbidity and mortality levels in a population, practices, attitudes and use of various health and nutrition services. Only morbidity data from NHS was analyzed in this study. Morbidity data is matched with income or expenditures data provided in the Family Income and Expenditures Survey (FIES). The LFS-ISH Survey household control number at the regional level was matched with the FIES to track income and expenditures to the household surveyed for health conditions. A description of the matched data sets is shown in Appendix One.

Other data sources include the information provided in Solon, et al (1992), the background papers for the Health Finance Development Project (HFDP) and selected results from studies conducted under the Philippine Institute for Development Studies - Department of Health Project (PIDS-DOH). The Solon, et al. (1992) work consists of raw tables compiled to serve as a basis for a national health accounts. The appendix tables to the 1993 World Development Report were also used for comparative purposes.

3.2 The Over-all Pattern of Health Care Financing

Table 3.1 shows health care expenditures in the country by financing sources. Public financing was at 7 billion pesos according to recent estimates. This was nearly half of the 13 billion pesos spent by the private sector. However, an 8.0 percent increase for public spending in current prices, after adjusting for inflation, translates to a 40.8 percent fall in spending between 1988 and 1991. The fall reflects the

Table 3.1
Health Care Expenditures, by Financing Source
1988 and 1991

Source	Current Prices			Real Prices (1987=100)			Source as	
	1988 Billion Pesos	1991 Billion Pesos	% Change 1988-199	1988 Billion Pesos	1991 Billion Pesos	% Change 1988-199	Percent of Total 1988	Percent of Total 1991
PUBLIC	6.87	7.42	8.0	6.31	4.49	-40 8	50.4	36 3
Taxes	5.87	6.34	8.0	5.40	3.83	-40.8	43.0	31.0
Indirect	4.11	4.44	8.0	3.78	2.68	-40.7	30.1	21.7
Direct	1.76	1.9	8.0	1.62	1.15	-40.8	12.9	9.3
Operating Income	0.29	0.26	-10.3	0.27	0.16	-69.6	2.1	1.3
Foreign Assistance	0.09	0.11	22.2	0.08	0.07	-24.4	0.7	0.5
Local Governments	0.62	0.71	14.5	0.57	0.43	-32.8	4.5	3.5
PRIVATE	6.77	13.00	92.0	6.22	7.86	20 8	49.6	63 7
Household Spending	5.82	10.94	88.0	5.35	6.61	19.1	42.7	53.6
Compulsory Insuranc	0.71	1.73	143.7	0.65	1.05	37.6	5.2	8 5
Private Insurance	0.24	0.33	37.5	0.22	0.20	-10.6	1.8	1.6
Total	13.64	20.42	49.7	12.54	12.35	-1.5	100	100

Adapted from Herrin, et.al., 1993.

economic difficulties in 1991 following a coup of military rebels in December 1989. Investments declined and government spending was squeezed. The decline in public spending was made up for by private spending, which showed a 21 percent increase in real terms between 1988 and 1991. Spending from the compulsory insurance programme, while only about one-sixth of household spending, rose by 37.6 percent in real terms during the period under consideration. Expenditures from private health insurance sources declined by 11 percent, in real terms, between 1988 and 1991.

An examination of financing sources show that 85 percent of public expenditures came from taxes, of which 70 percent were from indirect taxes --a regressive form of taxation (WHO, 1991). The next biggest source of public financing was local government which contributed about 10 percent, followed by operating income raised from fees, at four percent, and foreign assistance at about two percent. The largest source of private health care spending was household budgets, comprising about 85 percent of total private spending or 54 percent of total health care expenditure. Compulsory insurance comprised an increasing share of health care spending, rising from 5.2 percent of health care spending in 1988 to 8.5 percent in 1991. Private insurance remains the smallest source of health care spending claiming only 1.6 percent of total health expenditures.

The efficiency of the health system can be gleaned from a comparison of the spending on health and health outcomes with other countries in the region. Table 3.2 shows total and sectoral spending for health as well as some indicators of health outcomes. The Philippines has the second lowest health care spending as a proportion of GDP and the second lowest health outcome; not much worse than Indonesia but not better than Thailand and Malaysia. The Philippines, with limited resources expended

Table 3.2
Health Care Expenditures and Health Outcomes
1990

Countries	Total Health Care Exp. as % of GDP (%)	% Public Spending	% Private Spending	Per Capita Health Care Exp. (US$)	Perinatal Mortality/a	Female Adult Mortality /b	Life Expectancy Birth	Prevalence of Malnutritio (Under 5)
Indonesia	2.0	25.6	66.7	12.0	40.0	212.0	59.0	14
Korea	6.6	44.0	55.8	377.0	10.0	67.0	72.0	..
Malaysia	3.0	59.1	36.1	67.0	25.0	120.0	71.0	24
Philippines	2.2	46.7	46.4	14.0	27.0	172.0	64.0	19
Thailand	5.0	20.4	78.7	73.0	25.0	163.0	68.0	26

a/ number per 1,000 births of perinatal deaths (late foetal deaths, occuring at 28 weeks of gestation or thereafter, and early neonatal deaths, occuring within the first seven days of life

b/probability of dying between ages 15 and 60, expressed per 1000

Reference: 1993 World Development Report / Summary Report

on health, appears more efficient in countering under-5 malnutrition; perinatal mortality appears not to be widely different from the next-ranked countries, nor does female adult mortality.

3.3 Household Health Care Spending and Health Status

As the biggest source of health care expenditures, household health care spending patterns deserve closer scrutiny. Table 3.3 shows how expenditures on health care goods and services differ across income groups. The items covered under the heading health and medical expenses are as follows: drugs, hospitals, doctors' fedental fees, and other expenses which include many items from wheelchairs to traditional medicine. Health care expenses as a percentage of total expenditures increase with income, with the upper income quintiles reporting shares 75% higher than the share of the bottom quintile group. The bottom quintile's medical expenses' share of their household budgets is also higher than the share for each of the next three quintile groups.

The distribution of these medical expenses, amongst the different forms of health care, showed that the lowest quintile group's spending on medicines and drugs comprised 75% of their health care budget. Drugs comprised the biggest health care item purchased in all quintile groups except the upper group. This shows an over-all trend in poly-pharmacy or self-medication, presumably without medical advice. This

Table 3.3
Health Care Expenditures by Households,
By Expenditure Class and by
Type of Health Care Items

Expenditure Class	Annual Per House-hold HCare Expenditures Pesos	Medical Care Expenditures as % of Total HH Expenditure Percent	Medical Care Expenditures as % of Total Medical Exp				
			Drugs	Hospital	Doctor's Fees	Dental Services	Other Medical
1	180	3.8	75.1	4.1	11.4	0.3	9.2
2	310	2.3	61.3	6.1	18.0	1.4	11.2
3	372	2.8	57.4	12.1	21.6	2.0	7.0
4	683	3.4	51.3	15.4	24.4	2.3	6.6
5	1,690	6.6	30.7	45.9	16.2	4.0	3.1

1987 FIES-NHS Matched Files

does not reflect well on the efficiency of care-seeking behaviour as ill-advised self-medication may be harmful. At the macro-level, the inefficiency translates into widespread drug resistance that will entail greater expenses for more costly medication. For the upper income group, hospital expenses got the biggest slice of the health care budget. The second biggest purchase for the bottom four quintile groups was doctors' fees. Expenditures for dental services ranked lowest in the population's health care spending.

The finding that upper income groups are spending a higher proportion of their incomes on health care goods and services compared to the lower income groups indicates that health care is a normal good. Expenditures on it increase with income. Household expenditure data, particularly health care expenditure, however, may also suffer from under-reporting which may make the trends of middle and upper income groups mere statistical artifacts. But, higher spending shares by the low income group compared to the middle quintile group may reflect poorer health conditions among low income households. Indeed this is what one may find when information on health status of households is examined.

Table 3.4 presents both the actual distribution of self-reported illness, with standardized distribution. Standardization allows the removal of collinearity in demographic variables, age and sex, with income. Age and gender differences are likely to be associated with morbidity and utilization of health care. The method for standardization is discussed in Appendix 2.

The actual distribution of illness across income groups indicates a nearly one-to-one correspondence; i.e. the bottom 20 percent of the income group report nearly 20 percent of illness, the second 10 percent report another 20 percent of illness and so

Table 3.4
Percent of the Population Reporting Illness
Actual and Standardized

Income Decile	Actual	Standardized
First	12.4	18.5
Second	11.8	9.5
Third	11.5	11.1
Fourth	10.6	12.2
Fifth	12.6	9.6
Sixth	10.3	8
Seventh	10.4	7.7
Eighth	10.4	7.9
Ninth	10.1	7.8
Tenth	9.7	7.7
	100	100

Source of Basic Data: 1987 NHS-FIES Matched Files (NSO)

forth. However, upon standardization, differences between the upper income groups and the bottom quintile groups widened. Separating the effects of age-sex from income yielded a bunching up of reported morbidity in the lowest income decile. This indicates that groups with higher than average morbidity, i.e. younger male children and the elderly, are disproportionately located in the lower income bracket. This appears, therefore, to provide support for the view that low incomes are associated with poor health. A similar standardization procedure undertaken on British data by O'Donnel and Propper (1988), showed a narrowing of the degree of inequality in the reporting of morbidity between income groups upon standardization, indicating that the elderly, the high risk group, were well-distributed among various income groups.

Table 3.5 shows that self-reported morbidity follows a U shape, with the lowest morbidity reported by the 36-49 age group. Large differences between the sexes in the youngest age group were reported in the urban areas. Mean number of days sick reported for both sexes averaged about 7 days. In terms of self-reported illness, women generally appear to be healthier than men. This may be in contrast with the pattern from other countries; like for example in Egypt, where, due to reporting problems, men were less likely to report an illness than women (Ellis, et al., 1994). Mortality trends in the Philippines, however, reflect the same gender bias in morbidity patterns: male death rates were generally higher than female death rates, across all age groups (Herrin, et al., 1993).

Combining illness with expenditure patterns, it is observed that illness is concentrated among lower income groups while spending for health care shows concentration in favour of the upper income groups. Determining the extent of concentration of illness and expenditures can be illustrated through a concentration

Table 3.5
Percent of Population reporting illness, by urban/rural, age-sex
Mean Days Sick

	Urban		Rural		Total	
Age Grou	Male	Female	Male	Female	Male	Female
0 - 5	39.56	35.21	34.29	34.87	35.9	34.97
6 - 15	24.73	23.21	23.35	23.89	23.77	23.68
16 - 35	15.09	18.85	18.51	17.67	17.47	18.02
36 - 49	9.95	10.09	10.84	9.73	10.57	9.84
50 +	10.67	12.64	13.01	13.85	12.3	13.48
Days Sick (Ave.)	6.79	6.42	6.73	6.58	6.63	6.53

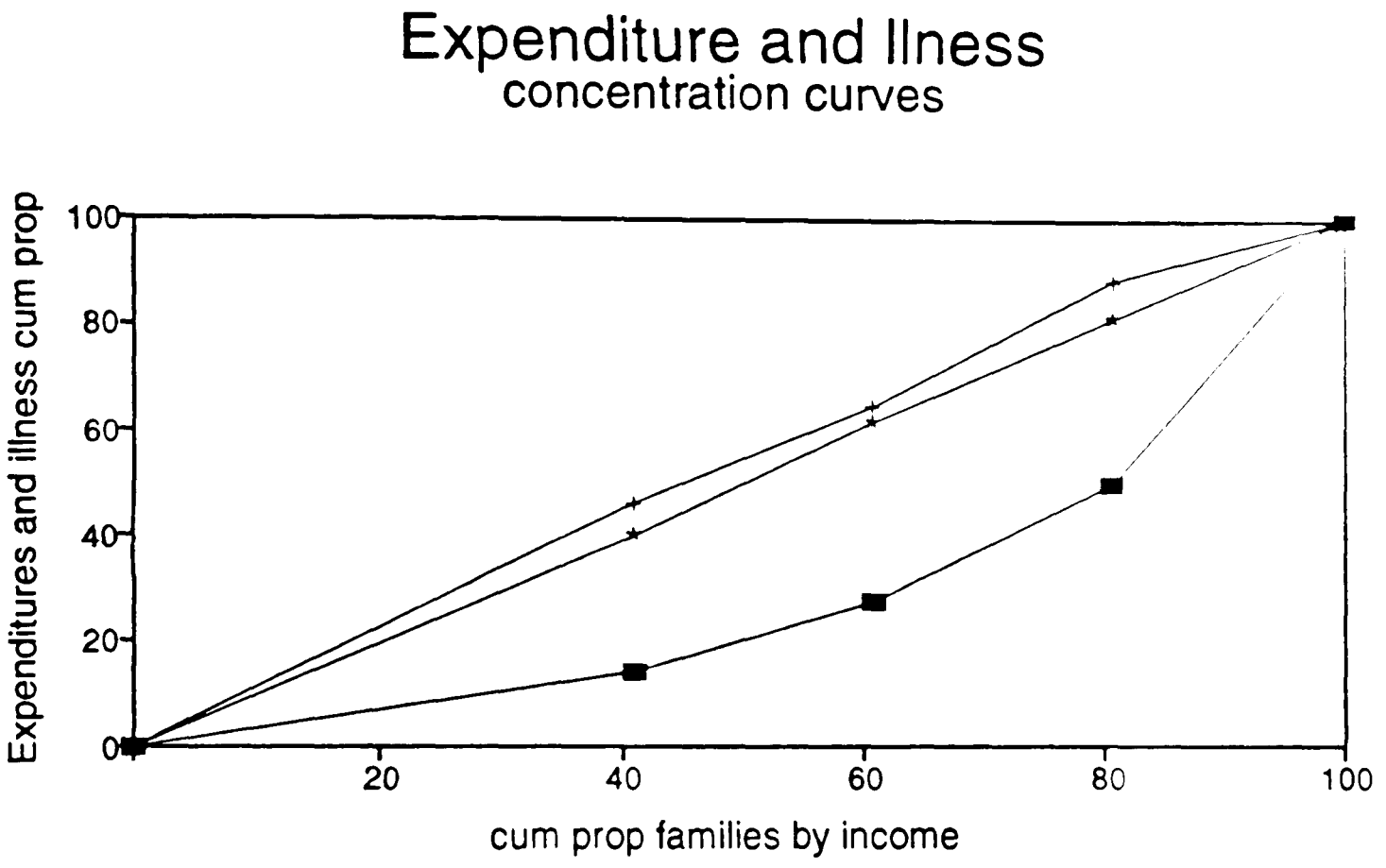
Source of Basic Data: 1987 NHS-FIES Matched Files (NSO)

curve. Wagstaff and van Doorslaer (1993) showed that one can plot concentration curves to examine the extent of inequity in health and health care financing. The method involves ranking individuals in terms of ability to pay measure, usually income or equivalent adult income. The matched data sets provided information on individual illness from the national health survey, and information on income from the family income and expenditures survey. The latter contained only information on family size, the individuals were ranked according to per capita income.

Figure 3.1 shows the concentration curves. The diagonal represents equal distribution of illness and spending across income groups. The illness concentration curve was drawn (upper portion of the diagonal) by plotting the cumulative proportion of the population ranked according to the measure of ability to pay, income, from the most disadvantaged to advantaged, against the cumulative proportion of illness, standardised for age and sex. The position of the curves suggests that lower income groups have a bigger share of the illness burden than the rich. The concentration curve for expenditures was drawn (lower portion of the diagonal) by plotting the cumulative proportions of the population, ranked according to income, by their expenditures shares. Household health care spending appears to favour largely the rich. The concentration of poor health among lower income groups suggests a double-edged situation: poverty and ill-health.

The curves do not provide conclusive evidence of the extent of inequalities in health and health care spending, but were intended to be merely suggestive of the trends. There are bias attendant to both measures. Self-reported illness may interact with wealth. Wagstaff and van Doorslaer (1993a) cited Blaxter's (1989, p. 217) observation that self-assessed health produced "remarkably steep and regular gradient

Figure 3.1



Source: 1987 FIES-NHS Matched Files

by social class" (Wagstaff and van Doorslaer, 1993a, p.55). Health care expenditures, on the other hand, suffer from similar problems related to under-reporting and infrequency of purchase, and may therefore be underestimates.

3.4 Private Institutional Sources of Health Care Financing

3.4.1 Commercial Indemnity Health Insurance

Private health insurance is the least developed as a source of health financing in the country, accounting for less than one percent of health spending, or P200 million (£4 million) in 1990. In 1988, there were only 102 companies reported in the Insurance Commission as being engaged in health insurance activities. This figure is not much different from the number of firms reported to be engaged in the same business in the 70s (Gamboa, et al, 1993). Health insurance is largely part of non-life insurance companies' activities rather than life insurance companies. Health insurance is considered as a "rider" or "sweetener" to life or accident insurance packages; but at a high added premium. While domestic ownership or ownership by nationals prevails; in the earlier years, foreign ownership was predominant. The deep economic crises in the mid-eighties saw some ownership realignments, with foreign firms comprising less than one-fifth of all firms in the industry in 1988.

There is very little information available about health insurance companies in the country and that which is available is largely from the Insurance Commission. Basic information on enrolment is considered proprietary. Private health insurance is largely commercial indemnity where the insured are reimbursed, usually for hospitalization expenses, based on pre-agreed benefit ceilings. Any expenses beyond these ceilings have to be shouldered by the insured.

While industry sources interviewed in Gamboa, et.al.(1993) consider health insurance as their least profitable business. Table 3.6 shows that profits remain healthy. Gross premiums increased in real terms, even as gross risks or the face value of health policies have declined for most of the 80s. This trend implies that premiums rose faster than the risk values. Loss ratios, or the value of benefits paid over premiums have changed very little, appearing flat in real terms. For every 100 pesos received as premiums, 20 pesos are paid out as benefits in real terms or 51 pesos in actual 1988 prices. No comparable estimates can be made with other businesses. But Hsiao (1995) observed that costs and profits in the U.S. can only run as high as 25 percent of premium revenues.

3.4.2 Health Maintenance Organizations

Health maintenance organizations or HMOs differ from the traditional indemnity health insurance in the sense that they provide not only insurance but also offer direct care to members. They provide more comprehensive benefits, including inpatient, out-patient care, diagnostics and health promotion or preventive programmes like immunization and some health information. Like the traditional indemnity insurance model, they do have benefit caps and exclusion items. Excluded are pre-existing illnesses and certain catastrophic illnesses. But beyond this, there is very little cost sharing involved, except when the services are sourced from non-affiliated facilities. Members are provided with cards which they can show to accredited facilities and receive free care.

Extensive work by Alfiler(1989) on HMOs in the Philippines listed about 17 commercial HMOs. Table 3.7 shows that these companies basically started operations in the 80s, although one began in 1960s. Most of these companies originally began as

Table 3.6
Financial Profile of Private Health Insurance Companies
1987 Prices

Year	Number of Companies	Gross Premiums '000 Pesos	Percent Change	Gross Risks* ('000 pesos)	Percent Change	Gross Losses** ('000 pesos)	Percent Change	Loss Ratio*** (%)
1981	21	3,952		1,761,509		1,420		2.8
1982	98	4,153	5.1	1,173,704	-33.4	1,567	10.4	2.7
1983	98	4,354	4.8	1,057,987	-9.9	876	-44.1	5.0
1984	98	3,282	-24.6	998,745	-5.6	1,655	88.8	2.0
1985	78	3,591	9.4	842,740	-15.6	1,523	-8.0	2.4
1986	104	4,102	14.2	772,370	-8.4	1,936	27.2	2.1
1987	105	4,253	3.7	1,110,299	43.8	2,347	21.2	1.8
1988	102	4,307	1.3	1,156,113	4.1	2,177	-7.3	2.0

* Gross Risks refer to the total face value of the health insurance policies
** Gross Losses refer to the value of benefits paid out
*** Loss Ratio refers to Premiums divided by Losses

Source: 1981 - 1987: CRC (1991), Philippine Health Care Factbook
1988: Insurance Commission Annual Report 1989

Table 3.7
Number and Origins of Health Maintenance Organizations (HMO)

Name of HMO	Date of Incorporation	Start of Operations	Organization Affiliation	Approx. # Enrollees 1989	1991	Client base
1. Blue Cross			Insurance Co.	5,000		
2. Family Medcare		1987	Insurance Co.	10,500	50,000	Coporate
3. Family HealthCare Plan		1991	Hospital-based		< 1,000	
4. Fortune Care	1985	1985	Insurance Co.	25,000	50,000	40% Corporate
5. Health Care & Dev't	1980		Hospital-based	4,000		100% Corporate
6. HealthKard Int'l, Inc.	1987	1987	Hospital-based	1,000	185,102*	
7. Health Maintenance Inc.	1981			78,000	35,000	85% Corporate
8. Health Plan Phil.,Inc.	1986	1986			10,000	
9. Intercare	1978			5,000	15,000	100% Corporate
10. Lifecare	1986			30,000	25,000	
11.Maxicare	1987		Hospital-Based			
12. Medicard	1986			18,000	30,000	
13. Pamana Golden Care		1987		90,000	226,367*	90% Corporate
14. PhilamCare	1982	1985	Insurance Co.	80,000	100,000	60% Corporate
15. St. Patrick's	1965	1965	Clinic-based	10,000		100% Corporate
16. St. Vincent	1988	1965	Clinic-based	5,000		80% Corporate
17. Waterous Medical Corp.	1981		Hospital-based	14,000		100% Corporate

* Includes PMCC-HMO Tie-up members (a pilot project using compulsory insurance funds and HMO facilities and systems)

Source: M.Alfiler, 1989. "Health Maintenance Organization As An Alternative Mode of Financing and Delivering Health Care in Philippines," PIDS.
1991 info: interviews with industry sources

Reference: R. Gamboa, 1993, various tables

hospital-based, that is, they were provider-initiated, while a number were offshoots of major insurance companies. Their origins as provider-initiated firms suggest that these HMOs just built on the existing networks among providers. Total estimated membership was 375,500 in 1989, less than one percent of the population. The figures in 1991 were incomplete. The client base of HMOs were mostly corporate. That is, group coverage appears to preferred to individual coverage to prevent adverse selection. However, firms themselves practice selection by locating most facilities in Metro Manila (Table 3.8); where most enrolees are likely to have steady employment, higher income, more likely to be in better health.

The same table indicates that most Philippine HMOs neither own hospitals nor employ full-time medical specialists. Instead, they arrange for clients to receive care from accredited providers, working on existing networks among other providers. Members who choose their own providers outside the HMO accredited providers are likely to be reimbursed at less than the full cost of care. This peculiarity signifies that HMOs in the country are unlikely to play a significant part in containing costs. Relying on accredited facilities suggests that reimbursements to provider remain largely on a fee-for-service basis.

3.5 Compulsory Financing of Health Care: The Medicare System

3.5.1 Organizational Structure and Population Coverage

The compulsory health insurance programme is known as Medicare. It covers the employed population in the country, although an increasing number of self-employed can join in voluntarily. It was organized as part of the over-all social security system; as such fund collection and fund management remain with the two

Table 3.8
HMO Professionals and Facilities Support

Name of HMO	# Primary Physicians	# Accredited Physicians (Metro Manila	Accredited Hospitals Metro Manila	Outside Metro Manila	# of Own Clinics	Medical Service Units
1. Blue Cross	13		8	2		8
2. Family Medcare			21	64	2	21
3. Family HealthCare Plan						
4. Fortune Care	10	94	19	8	4	19
5. Health Care & Dev't		150	10	2		10
6. HealthKard Int'l, Inc.	17	89	15	1		14
7. Health Maintenance Inc.	26	400	13	2	3	13
8. Health Plan Phil.,Inc.	45	165	9	14	1	19
9. Intercare	8	156	10			7
10. Lifecare	32	232	16	12		13
11.Maxicare	9	135	9		1	9
12. Medicard	19	235	18	9		8
13. Pamana Golden Care			16	12	1	16
14. PhilamCare	23	262	17	23	5	12
15. St. Patrick's	30		8			8
16. St. Vincent			8	5	1	8
17. Waterous Medical Corp	12	92			7	

Source: M.Alfiler, 1989. "Health Maintenance Organization As An Alternative Mode of Financing and Delivering Health Care in Philippines," PIDS.

Reference: R. Gamboa, 1993, various tables

systems, the SSS (Social Security System) for private sector members and the GSIS (Government Service and Insurance System) for government members. Historically, the Medicare has operated separately from the Department of Health. It was mandated in 1969 and formally established in 1972. After the 'people power revolution' in 1986, Medicare (more strictly, the Philippine Medical Care Commission, PMCC) was transferred to the Department of Health as an attached agency. The PMCC Board, headed by the Secretary of Health, serves as the policy-making body for Medicare. The PMCC staff undertakes accreditation of physicians and facilities as well as benefit reviews, monitoring functions and providing technical support to the PMCC Board.

Membership is compulsory to government and private employees and their dependents. Including dependents, total programme coverage reached about 22.23 million in 1988. This comprised about 38 percent of the population (Table 3.9). Despite its compulsory character, recent estimates showed that principal membership was barely five million or about one-fourth of the employed (Gamboa, et.al., 1993). This reflects inefficiencies in the social security system as a whole. The predominance of small-scale, informal businesses in the country make compliance with the laws hard to monitor. Staff shortages in the monitoring agencies contribute to inspection and collection problems.

3.5.2 Contribution Structure and the Burden of the Payroll Tax

Contribution to the Medicare is a form of a payroll tax. Members contribute a portion of their monthly income based on a contribution structure. The contribution base is capped for monthly earnings above 3,000 pesos; implying that contributions are uniform even for salaries beyond this amount. At present, those earning above P3,000 pay P37.50, and the employer pays the same amount. Those earning P1,000

Table 3.9
Medicare Programme Coverage

1972-1988

Year	Total Coverage /a		Principal Members	
	Total No. (Million)	As % of Population	Total (Million)	As % of Employed
1972	5.59	14.4	1.78	14.2
1973	8.47	21.0	2.12	15.3
1974	9.25	22.5	2.28	16.5
1975	10.99	26.1	2.72	18.8
1976	12.42	28.6	3.08	21.7
1977	13.54	30.4	3.35	23.4
1978	14.72	32.1	3.65	22.7
1979	16.01	34.0	3.97	24.5
1980	17.56	36.5	4.35	26.5
1981	18.40	37.1	4.56	26.2
1982	19.53	38.5	4.84	28.0
1983	21.32	41.0	5.44	28.3
1984	27.63	51.8	5.69	30.2
1985	29.06	53.2	5.98	29.8
1986	29.77	53.2	6.11	21.7
1987	21.84	38.1	4.52	21.5
1988	22.23	37.9	4.60	20.0

a/ Includes principal members and dependents, including self-employed retirees

Reference: PMCC; Gamboa, et al (1993)

pay P15.65, with the employer paying the same amount. This is a regressive feature as the contributions beyond the maximum salary base are not proportionate to income.

Beringuela (1992) estimated the incidence of the Medicare tax using a computable general equilibrium (CGE) model showing a broad set of interaction in production, consumption, taxes and income distribution. Her findings basically showed the effect of the tax to be small, generally less than one percent. As the tax lowers the disposable income received across income groups, the reduction in income after tax is much less for the upper income groups than for the lower income groups. In examining the degree of cross-subsidization the lower income quartile of workers, for both private and government sectors, were shown to receive more cross-subsidies from middle quartile groups than from the highest income quartile.

3.5.3 Organization of Care, Benefits and Provider Payment

The Medicare programme provides coverage for hospitalization in both public and private facilities. This provides an immediate bias towards inpatient care. Data provided by PMCC showed that the leading causes of hospitalization are acute gastro-enteritis, acute bronchitis and broncho-pneumonia (Solon, et al, 1990). The rate of member availment of their benefits averaged, since 1972 to 1990, around 6.5 percent of members with higher availment rates for government employees (10.4 percent) compared to private employees (5.4 percent) (Gamboa, et al, 1993). It appears that government workers are less likely to be healthy or more likely to seek care than private sector employees.

The Medicare programme does not provide 'direct' services, i.e. engaging its own doctors and operating its own facilities. Instead, its members are allowed to use any accredited facility and physician (of which there were 14,775 in 1992; as reported

in Gonzalez, et al., 1993). Providers are paid on a modified fee-for-service basis. The programme pays, for a period of confinement, on a fixed rate basis for in-patient charges like a daily room and board, professional fees, operating room, drugs and diagnostic tests. Hospital charges beyond the amount covered by Medicare are shouldered by the patients.

Benefits have not really kept up with inflation and with the contributions from employers and employees not changing very much, the amount paid out from Medicare has dwindled from its original target of 70 percent of hospital costs to only about 49 percent (Gamboa, et.al., 1993), indicating the heavy burden of cost-sharing. Table 3.10 shows that support values cover a lesser percentage of costs incurred in private hospitals than in public hospitals. The costs covered, or support values, in private facilities ranged from only 37.8 percent of room and board expenses, 41.1 percent of medical expenses. However, professional fees and surgeon fees in private facilities may not reflect the true picture of actual charges since physicians are known not to report their actual fees since the system reimburses a fixed amount relative to the value of the procedures.

Without any restrictions or laws against hospital charges, the low support value from Medicare implies that the greater part of costs falls on the consumer. The burden of the financial risk therefore, is borne heavily by the consumer and the social insurance system. The extent to which hospitals may suffer from bad debts is not known, but informal discussions with hospital owners indicate that it is prevalent.

3.5.4 Consequences of the Provider Payment System

Summarizing the discussion above, from a member's perspective, the combined effects of the small decrease in disposable income arising from the payroll tax and

Table 3.10
Average Actual Costs and Medicare Support Value
1989

Hospital Item	Average Actual Costs (pesos)			Medicare Support Value (%)		
	Gov't Hospitals	Priv. Hospitals	Combined Average	Gov't Hospitals	Priv. Hospitals	Over-all
Room & Board/Day	50.58	107.62	89.4	91.8	37.8	47.6
Medical Expenses	519.73	896.12	806.02	75.8	47.3	51.7
Drugs/Medicines	345.38	628.57	560.78	79.1	49.8	54.1
Lab, X-ray,etc.	218.02	319.47	296.03	69.1	41.6	46.2
Professional Fees	171.96	292.13	66.17	83.2	41.1	47.7
Operating Room Fees						
RUV 5 and below	228.22	670.58	502.65	89.9	29.0	39.5
RUV 5.1-10	371.38	1183.37	881.77	96.5	29.8	40.2
RUV 10.1 and above	731.57	1635.79	1348.09	100	47.5	56.6
Surgeon's Fees						
RUV 1-5	643.08	2106.94	1477.93	90.3	29	40.4
RUV 5.1-10	1916.91	4106.77	3196.38	100	37.1	52.7
RUV > 10.1	2883.81	6267.98	5033.21	95.1	43.1	54
Anesthesiologists' Fees						
RUV 5 and below	238.81	1045.33	649.98	87.98	23.1	34.7
RUV 5.1-10	606.87	1673.53	1160.45	98.4	31.6	48.3
RUV 10.1 and above	875.15	2007.64	1552.37	92.9	41.7	53.3
Other Fees	205.74	272.9	263.09	0	0	0
Total Amount/Claim	1383.29	2100.95	1931.52	84.7	41.4	48.9
Ave. Length of Stay	5.02	3.39	3.78			
% of Claims	24	76	100			

Source of Data: Philippine Medical Care Commission, Support Value Survey
Adapted from R. Gamboa, et.al., 1993. p. 24.

declining support values from Medicare, have led to a low utilization of Medicare benefits. With providers being immune from financial risk by the reimbursement system, Griffin and Paqueo (1993) observed that the Medicare system may have caused a rapid increase in the number of primary care hospitals (less than 25 beds). With Medicare reimbursement, these facilities can expect financial viability. Roemer (1991) observed that:

> "the administrative design of the Medicare system clearly suggests that it is also meant to give substantial financial support to the private market within the national health system -- both private doctors and private hospitals (. 300).

Comparative analysis of revenues per bed, across facility types, by Griffin, et al. (1994), seems to support this observation. The authors raised the following concern:

> The Medicare reimbursement system explicitly provides higher rates of reimbursement for secondary and tertiary hospitals relative to primary hospitals. It also distinguishes between regular and catastrophic cases. Thus one would expect that the revenue per bed would be substantially higher in secondary and tertiary hospitals relative to primary care hospitals, but it is not. It appears that primary hospital owners are able to achieve almost any level of revenue per bed that they desire, despite rules that provide them with lower reimbursement prices (p. 45).

The behaviour described above appears to suggest opportunism. Gonzalez, et al (1994) noted that PMCC suspects high incidence of fraudulent claims in certain regions of the country; an observation which can be examined against the distribution of facilities in Chapter 5. PMCC observed that close monitoring of 87 primary hospitals in 1991 brought down reported occupancy rates from 34.3 to 11.3 (PMCC, 1993). This reduction in occupancy rates resulted in a decrease in "unecessary claims which could have been filed and drained the Health Insurance Fund (Ibid., p.15). While the Medicare system, has the potential to act as a bulk purchaser of care for its members, its role has been limited largely to financial intermediation. The extent to

which the social health insurance fund is a major force in health financing is limited by the fact that its fund management does not rests with the PMCC. The National Health Insurance legislation introduced recently addresses this concern by combining the fund sources. Its implementation programme, however, remains to be drawn-up. The design of the programme which pays on a fee-for-service reimbursement, and the weakness of its monitoring systems has prevented Medicare from using the funds' potential to influence the health system towards efficiency and equity. However, there have been efforts to improve the system. One such attempt involved directly contracting with health maintenance organizations (HMOs) for integrated financing and delivery. This is discussed next as it highlights the sources of inefficiencies and the difficulties of effecting changes in a pluralistic health care financing system.

3.6 Alternative Financing Scheme: The PMCC-HMO Tie-Up

The Medicare system has sought ways to expand its benefits without undue burden to its members. One of the ways explored was the provision of health maintenance type benefits to members. In 1987, the PMCC launched an experimental programme to enhance the benefits for Medicare members by including outpatient care through the provision of HMO-type services. The programme, known as the PMCC-HMO Tie-Up Project, was not expected to involve major investments as HMOs were already operating in the country. It also viewed that the programme would involve minimal administrative costs as claims for reimbursement would now be filed with the HMOs.

HMOs, or health maintenance organizations, are vertically integrated firms, offering out-patient and in-patient services, in a pre-paid insurance scheme, through its

own salaried doctors and facilities (close panel) or through accredited providers (preferred providers). The concept was for the Medicare contributions from the social security scheme to be passed-on to the HMOs who were contracted to provide services for tie-up members. Membership was voluntary. The two social security agencies, SSS and GSIS remained as collecting agents, with a proportion of the contributions (initially 3 percent then increased to 34 percent) being retained by them. The latter adjustment was made after the first year evaluation which showed low utilization rates; and the increased administrative burden of member verification and validation of contributions on the funders. The additional portion retained by the funders was seen to facilitate the administrative delays.

On the initial solicitation of interest, 12 health insurance companies and 4 HMOs were invited. The four HMOs submitted proposals; but the project began, in June 1988, with only one HMO signing a memorandum of agreement. Nearly a year later, in May 1989, another HMO (not in the original four) entered into a memorandum of agreement with the PMCC. The geographic coverage of the programme was initially limited to Metro Manila. The benefit package included free medical consultations and benefit caps for in-patient care which are generally higher than the regular Medicare programmes. So for the same amount paid by regular members (around 68 pesos at that time), tie-up members were able to get more benefits with their contribution. Membership was voluntary.

After two evaluations, the programme was terminated. Results from the study conducted by an Arthur Andersen Consulting group (1994) showed that the contracted HMOs directed marketing efforts towards the top 1000 corporations in the country. There appeared to be inadequate member education and information, as direct

interviews with members showed that they were not aware of basic procedures. Mis-routed claims, with claims still being forwarded to the funders rather than the HMOs, also show insufficient information. The financial support offered by the programme, however, does not compare favourably with the regular Medicare programme, with support values estimated at 34 and 41 percent, respectively. This low support value arose largely from the tertiary nature of services largely offered by the HMOs. Low utilization rates (less than 1.0 percent of members) translated into profit margins ranging from 15 to 30 percent, on a cash basis , and 35 to 44 percent on accrued basis. Accrued rates suggest that reimbursement delays were experienced; hence, accrued rates are the profits to be realised once the remittances materialise. These margins were high compared to the profit margins of these HMOs on their regular program (1.0 and 19 percent).

For the collecting agencies, the SSS and GSIS, the delays arose from membership verification and validation of contributions. Mis-routed claims also held up the system. These costs comprise part of the transaction costs of the contractual arrangement between the two major parties: the funders and the HMOs. The extent of the costs was not foreseen before the contract. However, as will be shown in Chapter 7, these costs arose largely from the problem of motivation because of the unequal sharing of the burden of risks. Despite positive net gains arising from their share of the collections, the funders pushed for the programme termination.

The lessons from this experimental programme suggests that financing schemes that do not veer away from a fee-for-service orientation are unlikely to effect major changes in the health system of the country. The financial risks arising from the payment system are unequally shared, favouring the providers. The programme also

highlighted the nature of costs in health care market transactions, particularly between institutional payers and providers. The extent to which these costs influence the structure of the health care market is discussed in Chapter 7.

3.7 Conclusion

Health care financing in the country can be viewed as failing on both equity and efficiency grounds. The previous chapter showed that allocation pattern of government has been found to be unequally distributed among the regions, as against the regions' infant mortality profiles. In this chapter, an analysis of health care expenditure patterns showed that government spending was declining as a source of health care financing. A comparative picture, in this chapter, suggests that the inefficiency of the financing system reflects its level of development.

There was a heavy burden of household-based financing based on ability to pay. That this ability to pay did not coincide with the propensity for ill-health, suggests that the burden of disease was not equally shared. The heavy burden of cost sharing meant that compulsory insurance programme had limited impact in the sector. Population coverage and utilization rates were low. While low utilization rates mean that reserves are accumulating, the design of the reimbursement system provided impetus for opportunism. Private health insurance and health maintenance companies remain an unaffordable option for many. The strong profit orientation is unlikely to affect provider or consumer behaviour since it undertakes mainly financial intermediary functions.

The failure of the main institutions in the health sector, both government in general and health financing institutions, in particular, determines the market structure. In this pluralistic market, households are often left to fend for themselves, leaving aside

those with limited paying capacities and greater health needs. There is very limited information on how these households behave. Thus, much less information on how providers behave. Amidst these concerns, baseline information on consumer demand and the health care market is vital. Health sector reforms, particularly in areas that promote efficiency and equity, need to be guided by an understanding of the behaviour of households and the supply-side. The basic conditions of demand and supply, given the financing system, shape the structure of the market. Strengthening regulatory capacities entails the ability to foresee the impact of changing prices, income and other policy variables on consumer and provider response.

The next chapter examines the determinants of demand for out-patient care in the country. It also situates the examination of demand for health care in the context of a user fee policy for government services.

Chapter Four

The Conditions of Demand for Health Care in the Philippines

Introduction

The analysis of health care financing in the Philippines showed heavy reliance on household out-of-pocket outlays and the limited capacity of insurance schemes to ease the burden on households posed by financial losses arising from illness. Government tax-supported spending, has been shown to be inequitably allocated and inefficient; and has a limited budget constrained by pressures of the nation's debt (see Section 2.3 above). Health sector allocations need to address the twin-challenge of meeting basic health care needs whilst maintaining costly curative facilities.

Health care financing reforms, like those introducing pricing in government facilities, currently sweeping across developing countries, are likely to influence the pattern of household spending and demand for health care. The study of health care demand can provide valuable insights into the welfare effects of policy reforms that propose to introduce or increase prices in government facilities. This study examines the demand for out-patient health care from two perspectives: a) the determinants of the choice for provider and; b) the effects of changes in prices that may result from a user fee policy on demand for health care. The latter analysis provides an opportunity to estimate for basic demand parameters that are vital to understanding the market structure of health care in the Philippines. Estimates of the responsiveness of demand for health care by different income groups to changes in prices and time costs serve to highlight the equity impacts of the pricing reforms. The model used also allows the simulation of utilization and welfare effects of user fee policies.

The chapter is divided up as follows: The first part analyzes the policy issues and the behavioural assumptions of consumer demand models, particularly applicable for developing countries. The second part uses a provider-choice model to estimate the demand for out-patient care from a provider-choice model for the Philippines. The third part shows the results of the model. The chapter ends with a summary of the findings and implications for policy.

4.1 An Overview of Health Care Demand Studies in Developing Countries

4.1.1 A Review of the Policy and Research Issues

Health care demand in the Philippines has been the subject of pioneering work estimating demand functions. The work by Akin, et al. (1985), on the demand for primary health care services in the Bicol region, along with the work of Heller (1982) for Malaysia, broke ground for current global initiatives in health financing (McPake, 1993). These studies showed a weak, and often insignificant, explanatory power of economic variables. This evidence served as the basis for calls to introduce user charges in government facilities in developing countries (World Bank, 1987). Using an extensive set of prices data, including service fees, transport time and fares, drug expenses, along with information on insurance status, household assets, education, illness severity and quality of care, Akin and his colleagues found that only non-economic factors such as urban residence, mother's education and quality, were significant factors influencing the choice of provider. Heller's thorough examination of various aspects of demand; i.e. distinguished by type of care, discretionary versus curative, and the actual amounts of care consumed, showed that cash price, and time costs did not affect demand. It was also found that income had a weak influence on the decision to seek care, but had a clear effect on the type of care sought.

The insensitivity to economic variables of household choice of health care delivery services has been confirmed in other studies in the Philippines by Schwartz. et al.(1988), and Wong, et.al.(1987) for child and adult outpatients, and prenatal care delivery choices, respectively. However, it is not just important to know whether prices or income influence demand. It is also important to know how the effects may be felt across income sub-groups and to simulate behavioural responses for given changes in policy.

Subsequent analysis focused on the extent to which prices or fees prevent individuals from seeking care. Analysis of longitudinal data by Waddington and Enyimayew (1989; 1990) showed that a decline in utilization was an initial response in urban areas in Ghana, but utilisation level was regained thereafter. Rural health centre utilisation, however, never reverted to pre-user charge level. A work on Kenya, by Mwabu (1987), showed that user fees do prevent individuals from seeking care, especially if there are no perceived changes in the quality of services offered. A recent study in Cameroon (Litvack and Bodart, 1993), using an 'pre-test-and-post-test' experimental approach, showed that there was willingness to pay if supplies in health facilities (a measure of quality) could be assured. This willingness to pay was shown to be exhibited most by the poorest quintile groups whose probability of seeking care increased in greater proportion than the rest of the population. A study by Tembon (1995), for another province in Cameroon, showed that a substantial portion of health care costs borne by households are attributed to transport expenses and time lost from work. Therefore, reducing travel time and distance can serve as policy goals to improve accessibility of service facilities. Simulations, however, showed that household response to improved access was not as great as its response to changes in

actual facility charges. This appears to imply that fees or facility charges are greater deterrents to utilization than access costs.

McPake (1993) observed that the failure of models that showed prices to be insignificant may be due to the inadequate treatment of the 'quality of care' variable. Price variables, for example, may show net positive effects; i.e., the higher the price the greater the demand. This is has been taken as proof of the price-quality interaction in health care demand; i.e. higher price is often perceived to be associated with higher quality service quality. Studies on user charges incorporated in community financing schemes also showed this price-quality interaction (Litvack, 1994; McPake, 1993). The use of price as an indicator of quality suggests that non-price competition may prevail and that price may no longer serve as a useful allocative device in the market. The extent to which this is so in the Philippine out-patient care market can be accommodated in the health care demand model used in terms of the nature of the relationship between price and the demand for out-patient care.

Gertler et al (1987) and Gertler and van den Gaag (1990), in their studies on Peru and Cote d'Ivoire, showed the differential response to prices by rich and poor households. Earlier models were shown, by Gertler and colleagues, to have mis-specified the relationship between income and price as independent of one another. That the poor are more sensitive to price changes than the rich is not captured in earlier demand studies cited above because of the way the models were specified: prices and income variables were entered separately into the demand function. This implies that the poor and rich face and respond to price differences among providers in the same manner. The alternative method that enters prices as interacting with income captures this differential response and simulates the effects of policy on different income groups

in terms of the reaction of these groups to changes in the prices of medical care. And it is this model which this study applies for the Philippines.

The role of other factors affecting demand needs to be investigated as well, since in most developing economies the services are offered free. In the absence of prices or fees at facilities, travel time serves as a rationing device, with the poor eased out of the market because of distance to the facility (Acton, 1975). Household composition factors, like number of children and adults, also affect demand. Demographic characteristics of households, i.e. age and sex, have been shown to influence household health production functions, and therefore the utility derived from health care (Pollack and Wachter, 1975). These, and other factors used in this study are discussed in the specification of the model below.

4.1.2 Behavioural Assumptions

An exhaustive review of the demand for health care analysis is made in Akin, et al.(1985). This section provides a brief sketch of the key elements in consumer behaviour that are highlighted in this study.

The analysis of consumer behaviour in health care demand studies starts off with the assumption that individuals seek to maximize utility within the set of feasibility constraints. This decision making unit, widely viewed as an individual, derives utility from the consumption of goods or services. In health care, the ultimate objective is the maximization of health. Medical care is an input, among other inputs, in the production of health. This view is known as the health production function and is developed from a model pioneered by Grossman (1972). The demand for medical care is seen as a derived demand for health. A vector of characteristics that influence one's health include age, gender, food intake or other goods. Choices of goods/services are

constrained by the prices of these goods and the households' command over resources or income. Consumption of goods M (medical care) and X (other goods) is determined by the amount of resources available to the consumer or income (Y) and the prices of these goods (P) and the amounts of the goods bought. The individual maximizes welfare by choosing a combination of goods and services that fits within the budget constraint.

Becker (1965) argued that consumption activities involve time, and that prices of goods do not just include cash or money prices but also involve the use of time, which has a money equivalent expressed as wt, i.e. the hourly wage multiplied by the amount of time spent in wage employment. The role of time prices in health care demand has been fitted into the basic utility maximizing framework by Acton (1975). A crucial notion is that money and time spent on health care are money and time lost for other pursuits.

In summary, the basic theoretical premise about health care demand is that a consumer acts rationally in terms of maximizing his or her utility, given the choices depicted in his or her health production function, and subject to his or her budget constraint. In equilibrium, the consumer attains maximum utility when the marginal utilities of the commodities are equal to their price.

Standard demand functions are written as follows:

(1) $M^* = m(Y, P_m, P_x, a)$

(1.1) $X^* = x(Y, P_m, P_x, a)$

where M* and X* are optimal quantities of the goods *M* and *X* that yield maximum utility. And *a* refers to a vector of individual and demographic characteristics of the household affecting the demand.

4.1.3 Policy Parameters

Consumer demand equations permit the analysis of parameters of interest for policy-makers. These include estimates of the price elasticity of demand, income elasticities and willingness to pay. These parameters, as explained below, are vital for the formulation of policies that seek to alter utilization behaviour of certain groups for redistributive purposes. These parameters can also serve as "bases for accurate forecasts of future use and plans concerning the distribution of resources" (Rosko and Broyles, 1988).

Elasticities measure the degree of responsiveness of household demand to changes in prices or income. Policy-makers interested in increasing fees for health services or introducing them, can estimate the impact of these policies on households or consumers from knowing price elasticity of demand. An elastic demand means that households will respond strongly to price changes; while an inelastic demand means that the response of households will be less than the proportionate change in price. A developing economy wishing to anticipate changes in demand for health care when income changes by a certain proportion can also benefit from the information provided by income elasticity.

Given the predictions on price and income effects, the over-all welfare effect is measured in terms of the compensating variation concept. It is the amount needed to be paid to an individual who has been made worse off by a price increase, to make him or her as well off with the new prices as he or she was before the price change.

Identifying the amount needed to compensate individuals for the welfare loss can be gleaned from consumer demand functions. If the demand equation (1) above is incorporated into a utility function: max U = U (M, X), an indirect utility function

can be written as:

(2) $U^* = U^* (Y, P_m, P_x, a)$

where U^* shows the maximum welfare level that can be reached with income Y, prices P and other individual characteristics, a.

An inverse of the indirect utility function yields:

(3) $Y = C (U^*, P_m, P_x, a)$

Equation (3), known as the cost function, shows how much outlays or how much income, i.e. the compensating variation, is needed to achieve the maximum welfare or utility U^*, given prices and other characteristics are constant. A change in the price from P_m to P_m^1 results in:

(4) $Y^1 = C (U^*, P_m^1, P_x, a)$

The difference $(Y^1 - Y)$ is the amount needed to compensate those who suffer a welfare loss as a result of a price increase or, as in this study's context, the introduction of fees in government services[1].

4.2 A Model for the Demand of Out-patient Care in the Philippines

This section describes the model used to estimate a demand function for out-patient care and discusses its differences from earlier health care demand models (Akin,

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[1]Welfare economics, through the Hicks-Kaldor test, posits that compensation of losers by gainers following a policy change can lead to potential Pareto improvement. Scitovsky on the other hand, showed that if gainers can compensate losers to push through a policy change, it must also be shown that a reversal to the status quo cannot be made. There are doubts on the extent to which these compensation tests can contribute to allocation decisions given that these tests abstract from making value judgments on the nature of the welfare function, i.e. whether a one-to-one correspondence of utility gains and losses can be made between a poor and rich individual can be made (Gravelle and Rees, 1992). But the usefulness for policy of measures such as compensating variation or willingness to pay has been generally acknowledged (Just, et al., 1982).

et al., 1985; Heller, 1982) to highlight the analytical issues addressed by the model. The section ends with a discussion of the hypothesis on the nature of the health care demand function.

4.2.1 Analytical Specifications of the Model Used

This sub-section provides a descriptive account of the behavioural and empirical models used in estimating household out-patient demand. The model is more formally developed in Appendix 3.

The consumer demand model used in this analysis is the choice of provider and applies the specifications of Gertler, et al. (1987) and Gertler and van der Gaag (1990). A discrete choice model on out-patient care captures the discretionary nature of patient-initiated care. This approach is appropriate given the weak referral system and the private, pay-as-you-go, nature of health care purchases in the country.

The starting point of a choice-theoretic framework is the idea that when faced with the need for medical care, a consumer is faced with a choice of getting treatment from a set of providers or not seeking any assistance (self-care). One of several providers offers the individual the expected improvement in health for a price which can be expected to reduce the consumer's income and, thereby affect, his or her consumption of other non-medical goods. The provider chosen is the one whose quality and price yields the highest utility for the consumer. The consumer achieves utility not only the consumption of medical care but also consumption of other goods.

The solution to the utility maximization problem begins with the system of demand functions for the alternative providers, expressed in terms of the probabilities of choosing the providers. The distribution of the variables in the functional form of the consumer's utility function determines the form of the demand function.

The demand function for an alternative is the probability that the utility derived from that provider is greater than that from any other alternative, including self-care. The probability that self care and provider j is chosen from among the set of alternatives is shown, respectively :

(3)

$$\Pi_o = \frac{\exp(V_o)}{\exp(V_o) + [\sum_{1}^{J} \exp(\frac{V_j}{\sigma})]^{\sigma}}$$

(4)

$$\Pi_j = (1 - \pi_0) \frac{\exp(\frac{V_j}{\sigma})}{[\sum_{j=1} \exp(\frac{V_j}{\sigma})]^{\sigma}}$$

where σ is 1 minus the correlation between the error terms of the provider alternatives. V_j represents the utility derived from alternative j, with the following parameters:

(7) $V_j = b_{0j} + b_{1j}X + a_1(Y-P_j-wT_j) + a_2(Y-P_j-wT_j)^2$

where X is a vector of socio-economic variables, $(Y-P_j-wT_j)$ is the consumption term where Y is total income, P is provider prices, w is the opportunity cost of time and T_j is the travel time to the provider. The conditional utility function is therefore shown to be linear in characteristics that affect health and quadratic in consumption (net of medical care).

In summary, the demand function for a provider alternative is the probability that the provider yields the highest utility, among other providers, where utility depends on the expected improvement in health and consumption net of medical care. In a discrete choice specification, a poorer household is likely to choose a low price - low quality provider since choosing a high price - high quality provider is likely to represent a significant reduction of household budgets allotted for other needs. While higher income earning household is likely to choose a high price - high quality option. This behaviour is consistent only if health is a normal good, that is, the demand for health increases with income or the marginal rate of substitution of consumption for health diminishes as income increases, holding health constant.

The estimated demand functions take the form of a nested multinomial logit (NMNL). The NMNL specification can accommodate the following features of the demand model (Gertler and van der Gaag, 1990, p. 73): 1) correlation across sub-groups of alternatives and therefore non-constant cross-price elasticities; and, 2) the grouping of closely similar alternatives yield cross-price elasticities that are more elastic within than across groups. These features imply that the estimating technique be one which captures the degree of complementarity and substitutability within and among alternative provider choices.

The model is estimated using a full information maximum likelihood (FIML) which is shown by Henscher (1986) to be more efficient than two-step estimates (Gertler and van der Gaag, 1990). The LIMDEP programme software was used to obtain the results of the demand model.

4.2.2 Limits of Earlier Health Care Demand Models

Earlier studies on demand for health care (Akin, et al, 1985; Schwartz, 1988; Dor and van der Gaag, 1987; Ching, 1992) is limited in four ways: 1) the specification of the utility function; 2) estimating techniques; 3) how quality of care is captured by the model; and 4) data problems.

Firstly, earlier demand models specify linear utility functions where income is shown to vary with the provider alternatives[2]. Such linear specification of the utility functions is inconsistent with stable utility maximization; for it implies that (Gertler and van der Gaag, 1990):

> "...two alternatives that provide the same improvement in health for the same price must yield different levels of utility to the same individual...if this is true, then preferences are not ordered and transitive, and stable utility functions, therefore, do not exist (p.66).

The use of a single consumption term, $(Y-P_j-wT_j)$, differs from the usual separate treatment of prices and income, similar to equation (1). With prices shown to be interact with income, one can examine whether health is a normal good, with demand increasing as income increases, as discussed above. Specification of income and prices as a net consumption terms implies that even though provider prices may be zero, as is often-considered for government services, a price parameter can still be captured using travel time costs.

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[2] Consider the following conditional utility functions for doctor and self-care demand respectively: $U_d = a_0H_d + a_1(Y - P_d)$; $U_s = a_0H_s + a_1Y$. The alternative chosen is that which yields a positive net change in utility: $U_d - U_s = a_0(H_d - H_s) - a_1P_d > 0$. Income differences out but can influence choice so long as the marginal rate of substitution of health for consumption is allowed to vary. The specification of earlier models allow consumption coefficients to vary by alternative, i.e. $U_d = a_0H_d + a_{1d}(Y-P_d)$; $U_s = a_0H_o + a_{1s}Y$. The choice of alternative is determined by: $U_d - U_s = a_0(H_d - H_s) - a_{1d}P_d + (a_{1d} - a_{1s})Y > 0$. The restriction of different coefficients on consumption (non-health) implies different marginal utility of consumption for two alternatives despite same level of consumption.

A second problem with earlier demand estimates relates to the estimating techniques used, especially those using other forms of logit models. The problems with logit models in general, and the properties of multinomial logit specifications have been extensively discussed in Bitran (1988) and Tembon (1995). The implication of the problems related to multinomial and conditional logit models, as applied in the Philippines by Schwartz, et al.(1987) and Ching (1995) respectively, is to lessen the impact of variable changes on the demand for health care. Multinomial logit (MNL) imposes restrictions that cross price elasticities are the same across alternatives. Conditional logit models also impose the same restrictions and cannot assess the impact of income on demand, as only differences in utility matter (Bitran, 1988)[3]. To avoid this problem, Ching (1995) used a conditional logit specification in combination with Gertler-type specification of income and price as naturally interacting and tested for the correlation across alternatives. However, beyond this, Ching's work did not go further to simulate differential household responses to user fees, cross-price effects and estimates on welfare, as this study has done. But a comparison of related findings are made in the discussion below.

A third problem of health care demand estimates is related to the treatment of 'quality of provider' in the models. The problem stems from the difficulty of

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[3]Bitran (1988) cites Mwabu (1986) illustrating the conceptual differences between conditional logit and multinomial logit in terms of a one-mile walk to providers. Conditional logit considers a one-mile walk to a government health centre would be equally undesirable (same utility function) to another individual as a one-mile walk to a traditional provider. Multinomial logit, on the other hand, would have individuals valuing (different utility functions) each one-mile walk to different providers differently. Nested logit is a generalised form of multinomial logit which allows correlation across alternatives, avoiding the problem known as Independence of Irrelevant Alternatives (IIA). Hence, a person choosing a private provider over self-care may likely choose government provider over self-care. Nested multinomial logit assumes that consumer choices can be mapped sequentially as first a choice whether to seek care or not, and when a decision to seek care is made, the different choices can be categorised.

measuring the 'quality' variable. Akin, et al. (1985) used a dummy variable, whether the attending person was a physician or nurse, as a measure of quality. The availability of drugs or supplies has been used as a measure of 'quality' by Mwabu and Mwangi (1986) and Litvack and Boddart (1993). These measures of quality may be considered as exogenous measures of quality arising from consumer perceptions. The demand specification of Gertler and van der Gaag (1990), as followed in this study, treats quality as an unobservable variable and considers it as synonymous to the efficacy of the provider. As such, quality enters as part of the household production function for health, with individual and provider characteristics as explanatory variables. This implies that the reduced-form health care demand model is derived from a utility function where the measure of price effects are adjusted for quality. Individual characteristics, such as age, education and severity of illness, is shown to influence provider's productivity relative to self-care. Appendix 3 shows how this is formally incorporated in the model.

A fourth problem related to earlier demand function estimates is related to data limitations. The study by Akin, et al.(1984) on the Philippines, for example, estimated prices separately from the household survey. Prices applied were those that prevailed three years after the survey. Gertler and van der Gaag (1990) observed that data problems can probably account for the lack of significance of prices and income in earlier estimates by Akin et al. (1985), as following the latter's specifications, using the Living Standards Survey data for Cote d'Ivoire and Peru, prices and income were shown to be significant predictors of health care demand. Ching's (1995) estimates, while based on a national survey data base, also failed to consider time costs as part of the household budget constraint due to the lack of data on wages. Hence, a

comparison of differential household response to time costs with medical care prices cannot be made.

Moreover, the treatment of income also poses some problems (Bitran, 1988). The use of current income does not take into account that people may be forced to borrow for some necessities like health care or that consumption often exceeds income, particularly for low income households. For health care emergencies for example, households have been observed to sell belongings and other assets (Tembon, 1995; Abel-Smith and Dua, 1988). Heller (1982) observed that seasonality also affects the reporting of current income; suggesting that expenditures can better capture permanent income as a measure of household welfare. Household expenditure, as a proxy measure for permanent income, is used in this study as a more appropriate measure of income.

4.2.3 Factors Affecting Demand for Health Care

The quantitative analysis of health care demand involves the estimation of the demand equation, generating testable hypotheses on the effects of the right-hand side variables on quantity of medical care consumed. The factors that are hypothesized to influence demand, the expected direction of influence and specification issues are shown below. Earlier reviews on the factors determining demand for health care by Akin, et al.(1985) and Ching (1989) are not repeated here. Emphasis is placed on the factors that have been adjusted to allow for modifications introduced in the model.

Income

If health is a normal good, a higher income is expected to lead to increased demand for medical care. Poorer households are likely to demand lower-priced, lower quality providers; while alternatively, higher income households will seek higher-priced

providers. The consumption term in the model shows a net income concept, income net of the price of seeking care. In most demand studies in the developing world, it is household income which is the relevant measure rather than the individual's. Due to considerations of household welfare and problems, cited above, with the appropriateness of income measures, the study uses average monthly value of household expenditure to represent income. Expenditure, especially if it exceed income, incorporates a wealth component especially as it reflects one's ability to borrow from friends or relatives.

Households, however, are just as prone to under-report expenditures, just as they may under-report incomes. The questionnaire design tried to address this problem by including a checklist that itemized weekly, monthly and annual expenditures.

The average monthly value of household expenditure is estimated by summing-up weekly expenses by households especially for food, transportation, leisure (magazines, comics, beer or alcoholic drinks), with monthly expenses like rent, utilities and payment for household services. Other yearly expenditure items like school tuition, insurance premiums, mortgage, clothes, membership dues, etc., were adjusted to obtain monthly figures.

Price of Medical Care

The price of medical care includes not only out-of-pocket payments but also time costs. Out-of-pocket payments to the provider include not only professional fees, but also treatment costs in terms of drugs, tests, and other supplies. Expenditure for health care visits therefore reflect these out-of-pocket payments. For improved precision in the estimates (since some households reported not only fees but other

treatment costs and other households did not for difficulty of recall), and to capture variation in prices across alternatives, direct out-of-pocket outlays were estimated indirectly through hedonic pricing. The estimates are shown in Appendix 4. Specifying price of medical care as a function of individual characteristics, like age, sex, education, location, region, types of complaints and market structure (number of providers) capture the extent to which these variables are reflected in prices. The indirect estimates yielded low coefficients and t-values; but similar findings were observed by Ching (1995) and Gertler, et al. (1987).

Time Price

The time price is critical in developing countries. Given the widespread policy of free health care in the public sector, it is time that serves to determine who will seek care; i.e., those for whom the time price is relatively low (Acton, 1975). The time spent travelling to obtain care also serves as an indirect cost of access (Gertler and van der Gaag, 1990).

Time cost is a product of the travel time spent obtaining care from the provider and the individual's hourly wage. The time involved in consuming health care is seen as a lost opportunity to earn. If obtaining care is time-intensive, then wage loss is greater, and the price of seeking care is high and the subsequent demand will be low. For non-wage earning individuals and children, the hourly wage rate applied is the village-level agricultural wage rate.

However, this measure of time price (where wages are multiplied by travel time) is not without problems. It assumes that there is always a positive time price; which may not be true where unemployment maybe the norm, as more commonly observed in rural areas. The time price measure also correlates with wage income and

its inclusion would result in multicollinearity. This problem is partly avoided in the model which used, in the consumption term, expenditures as a proxy measure of income.

Transportation costs were estimated separately from travel time costs to facilitate travel time elasticity estimates. Transportation costs reflect not just distance, but also the state of roads and transport supply factors.

Other Household Characteristics

Individual and household characteristics that are expected to influence the choice of provider include severity, age, education, sex, number of children in the household and the number of adults in the household.

Severity and age may be considered as health status variables. Severity, introduced as a dummy variable, taking the value of 1 if the self-assessment (or mother's assessment in case of children) of illness is serious[4]. Perceptions of severity of the complaint is expected to trigger the initial decision-making process of seeking care. Weaker immune systems, and therefore, greater susceptibility to illness, are generally ascribed for very young or very old individuals. Therefore, age influences the likelihood of experiencing health problems and seeking care (Bitran and McInnes, 1993).

Education can be viewed as an efficiency factor, one which improves the general productivity of non-market care (self-care) for an individual (Grossman, 1972). Given the endogenous treatment of quality in the model, education can be viewed

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[4] Self-assessment of the severity of complaint was asked as follows: How did you assess the severity of the complaint: mild, moderate, severe. The question followed questions related to whether the reported complaint (4 weeks recall period) by a household member prevented the member from doing his or her usual activity, whether it made him/her stay in bed and the number of days in bed.

therefore to improve the efficacy (quality) of care as with more education, one can better implement treatment regimens on one's own. Alternatively, more education can mean better healthier or less use-intensive lifestyles (Muurinen and Le Grand, 1985). One could also have better information on health care sources with more education. With more education, one can also have higher earning capacities, hence the greater the demand for health care.

Gender is considered in the model by using a dummy variable that takes the value of 1 for males. Males are more likely to incur higher wage loss if untreated, which may prompt more immediate care, if not better care, than females.

Household composition variables refer to the number of children or adults in the household. A child's health may depend on the number of other siblings (Pollack and Wachter, 1975). While having more adults may mean a propensity to self-treat using the household's broader range of experience. Alternatively, household composition variables can be viewed as a productivity factor, indicating enhanced income-earning capabilities of the household. Having more children may also involve adult time, lowering income-earning capabilities. Having more adults on the other hand increases earning capabilities and therefore demand for health care.

4.2.4 Data

A household survey was undertaken to examine household decisions about choice of provider. It is a rider to a bigger research undertaking conducted by the Philippine Institute for Development Studies (PIDS) for the Department of Health (DOH). Henceforth, the database will be known as PIDS-DOH. The focus of the data gathering was on the role of economic factors, particularly income, prices and time

costs, in health seeking behavior. The sampling design used in the household survey is described in Appendix 1.

4.2.4.1 Study Sites

A household survey was conducted in four regions of the country, namely: Regions II, VII, X, and the National Capital Region. A location map is shown in Figure 4.1. The regions were chosen on the basis of socioeconomic conditions (GDP, population and health indicators and facilities). Table 4.1 shows how the provincial sites in the study compare with each other in terms of economic indicators. A total of 2,800 randomly-selected households, following a multi-stage sampling technique, were covered by the survey comprising 11,651 individuals.

4.2.4.2 Descriptive Highlights

For the majority (67 %) of households, who reported out-patient consultation during the past month, the consultation was as an initial visit; while more than one-fourth (26 %) reported that the consultations were follow-up consultations. While initial consultations may contain elements of what Heller (1982) distinguished as discretionary (own volition) and necessary (arising from illness) care; follow-up consultations may also suggest discretionary (check-up) but at the same time some supply-inducement. The model does not distinguish between these types of care.

Most out-patient consultations occurred in private clinics (41 % of households consulted privately), while 30 % consulted at the out-patient department of government facilities. Public clinic facilities like barangay health stations and health centres were visited by 23 % of the sample households. These figures appear not to deviate much from the pattern observed from national data. Data from national survey data, analyzed in Herrin, et al.(1993), showed a greater proportion of households utilising public

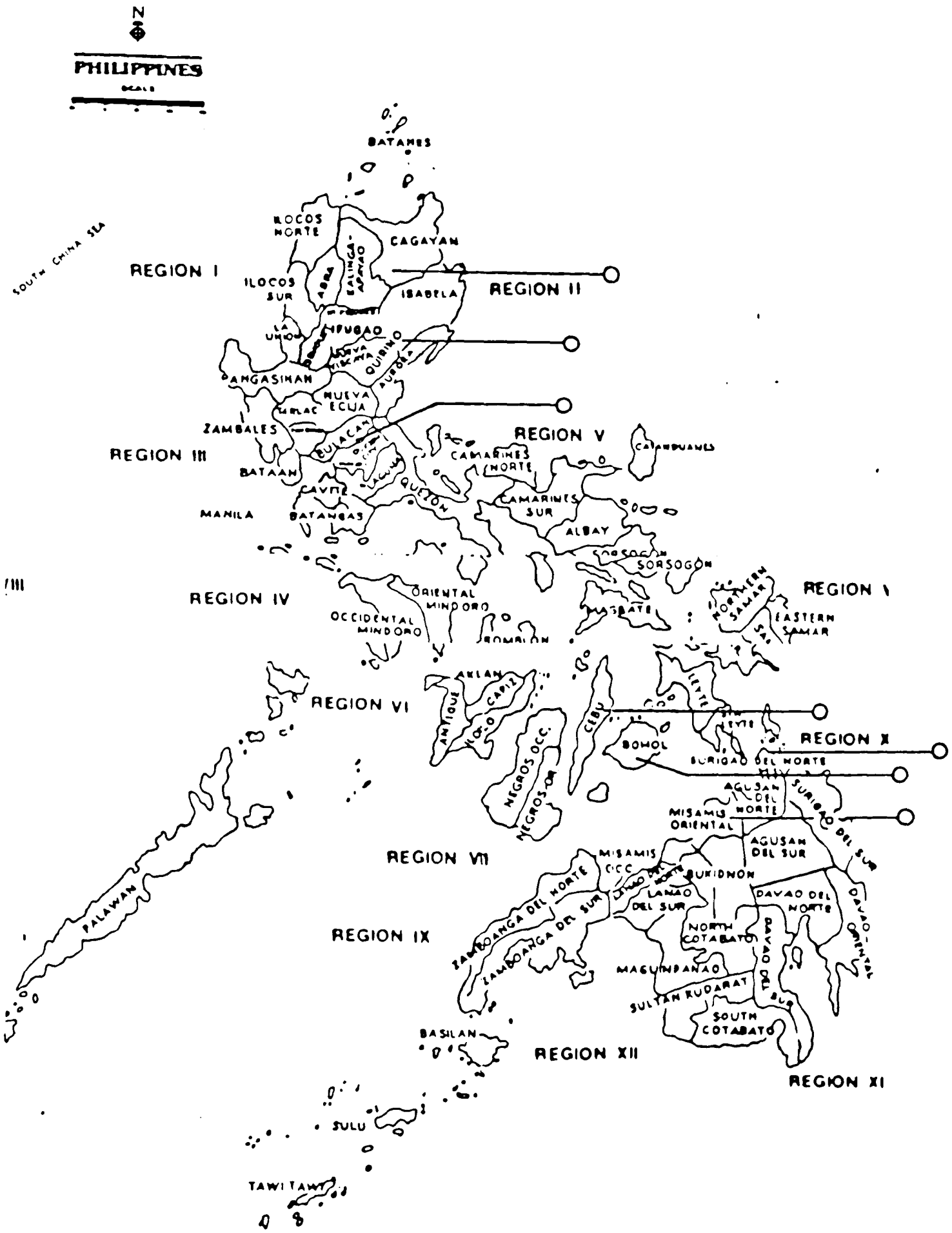

Figure 4.1 : Study Sites

(PIDS - DOH Project)

Table 4.1
Background Information on Study Sites
PIDS-DOH Household Survey
(as of 1990)

	Population a/	Per Capita Income (Pesos) a/	Infant Mortality Rates a/	Physician To Pop'n Ratio a/	Midwife To Pop'n Ratio a/	Total No. of Hospital Beds	
						Public b/	Private b/
Region 2		5,944		1:6518	1:4549		
Cagayan Valley	829,974		31.8			748	240
Quirino	114,132		23.8			160	240
Region 7		9,823		1:13,746	1:7824		
Cebu	2,645,735		28.0			2045	1718
Bohol	948,315		32.0			492	207
Region 10		9,857		1:7721	1:3688		
Surigao del Norte	425,978		20.0			445	60
Misamis Oriental	865,051		20.0			580	426
National Capital Region (NCR)	7,928,867	27,082	27.4	1:12,242	1:7781	10620	3158

Data Sources:

a/ Philippine Statistical Yearbook, 1990/1991

b/ DOH, BLR Masterlist as reported in Zingapan, 1994

hospitals (38%), compared to (23%) of households reporting private doctor care.

These facilities were largely outside the village. For 57 % of households, consultations were made at municipality level; while 27 % were made within the village. Some 12 % reported going further afield at the provincial level for their out-patient consultations.

In general, 86 % of households reported to have a 'usual source of care'. The usual source of care for 62 % of households were outside of their villages but within the same municipality. While for 24 % of households, consultations were usually made within the same barangay; and 13 % of households went to another municipality.

The survey also contained some statements to capture household attitudes and views: whether they agreed or disagreed. Responses to some of the statements are as follows:

1. We have enough facilities to take care of our needs. 71 % Yes 28 % No

2. Doctors in public hospitals are just as good as those in private hospitals.
   67 % Yes 32 % No

3. If the charges in a public hospital were the same as that of a private hospital, I would prefer to go to the private hospital. 77 % Yes 23 % No

4. A doctor who charges more has better expertise than a doctor who charges less.
   37 % Yes 63 % No

The descriptive data provides indication of the choices and preferences of sample Filipino households. The differences in household characteristics and their influence on the choice of provider can be assessed in terms of the health care demand model, outlined in the section 4.2.1. The next section presents the determinants of health care demand and the policy implications that flow from the model.

4.3 Results

4.3.2 Determinants of Provider Choice

Figure 4.2 illustrates the study's provider choice model. The unit of analysis is the individual. In cases where more than one sick member may be found in a household, sick household members were interviewed individually for questions on health status and utilisation[5]. Sick household members were individually interviewed for questions on health status and utilisation. Mothers responded for children. The analysis covered a sample of 2,039 individuals who reported an illness complaint during the past four weeks preceding the survey.

The model is specified as a nested multinomial logit, with the provider choices nested within the prior decision to seek market care over home-care. Table 4.2 shows the descriptive statistics of the variables used.

The results on Table 4.3 show that prices and income play important roles in the demand for medical care. The coefficients of the consumption term and its square are significantly different from zero. Medical care prices entering the consumption term and the consumption squared term including both a squared price and a price-income interaction term, the coefficients being significantly different from zero indicate that income and prices influence the choice of provider. The signs of the coefficients also indicate that with health as a normal good, a low income individual would choose additional consumption to additional health and that the marginal utility of consumption is diminishing. The magnitude of the impact of prices and income on demand cannot

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[5]There was an insignificant number (less than 10 households) of households who reported more than one member sick during the reference period, and therefore the problem of correlation in the errors across observations was viewed to be negligible.

Figure 4.2
The Out-Patient Provider Choice Model

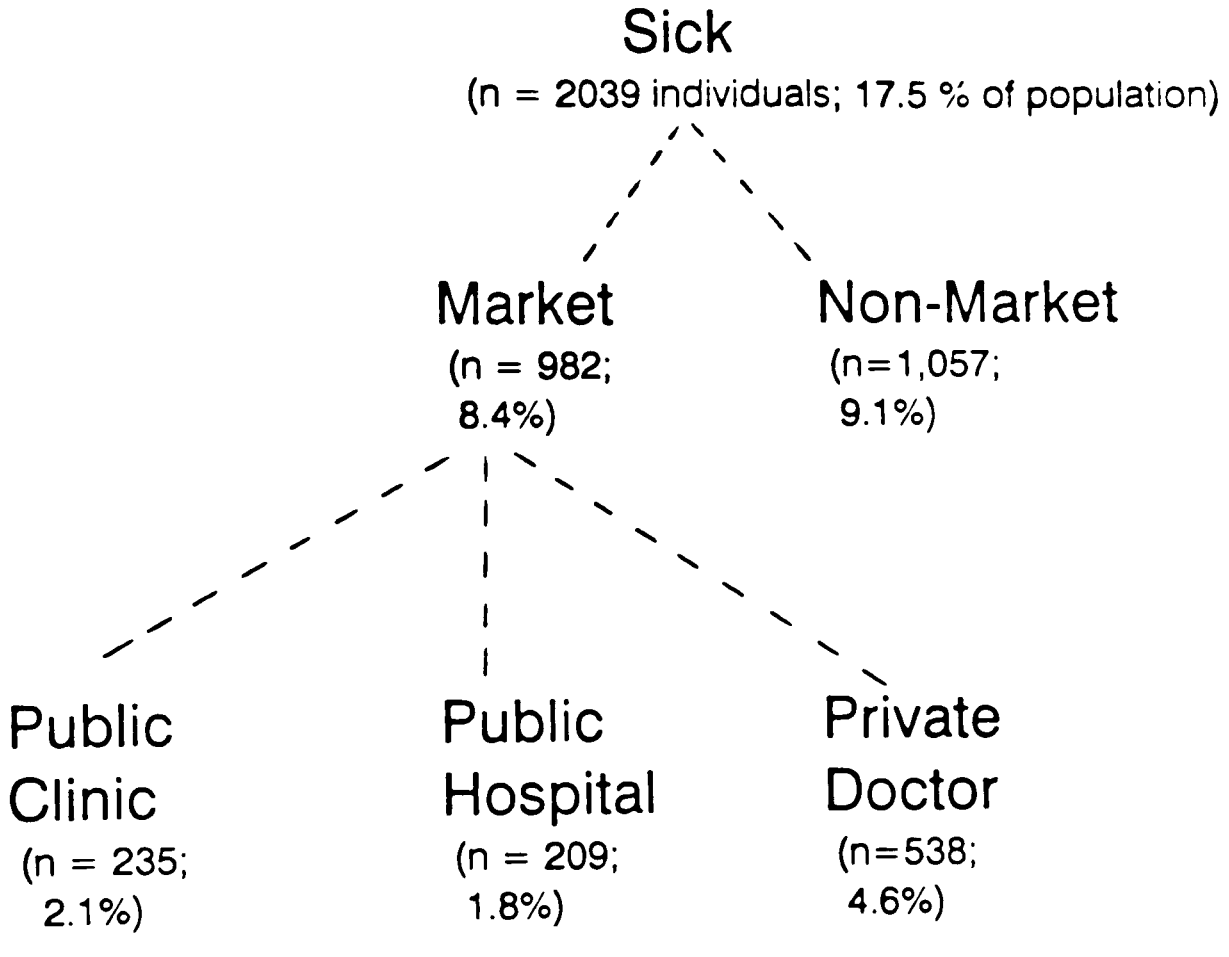


Table 4.2
Descriptive Statistics of an NMNL Model
of Out-patient Provider Choice

Variables	Description	Mean	Standard Deviation
Consumption	log of (total expenditures less price less time costs less transport costs)	8.08	1.05
total expenditures	pesos per month	5,406	8,358
price	pesos	44.30	83.82
time costs	pesos per hour	0.50	0.50
transport costs	pesos per visit	3.48	10.84
Education	no. of years completed	8.81	3.30
Severity	dummy (=1 if complaint is severe from self-diagnosis)	0.20	0.40
Age	years	19.79	20.28
Sex	dummy (=1 if male)	0.49	0.50
NChild	No. of Children < 15 years	2.64	1.72
NAdult	No. of Children > 14 years	3.14	1.56

Table 4.3
An NMNL Model Of Out-Patient Provider Choice
Philippines, 1993

Variable	Coefficient	T-Value	
Consumption	5.319	1.91	***
Consumption Squared	-11.629	-53.37	***
Sigma	0.275	4.43	***
Private Doctor			
Education	0.027	1.75	*
Severity	0.066	0.50	
Age	-0.006	-1.65	*
Sex	0.358	2.79	***
Nchild	-0.090	-2.39	***
NAdult	0.228	5.63	***
Public Clinics			
Education	-0.009	-0.48	
Severity	0.007	0.04	
Age	-0.006	-1.42	
Sex	-0.400	-2.58	***
Nchild	0.261	5.91	***
NAdult	-0.274	-4.97	***
Public Hospitals			
Education	-0.019	-1.01	
Severity	-0.079	-0.51	
Age	0.012	3.10	***
Sex	-0.089	-0.59	
Nchild	-0.013	-2.81	***
NAdult	-0.007	-1.58	***
Sample Size	2,039		
Log-Likelihood	-1,449.097		

Levels of Significance:
*** .01
** .05
* .10

however be discerned directly given their nonlinear specifications. A closer examination follows with the discussion on elasticities.

The estimated value of sigma (σ) is significantly different from zero but is close to zero, indicating that the alternatives are closer substitutes to one another than they are to self-care. One provider's demand is more sensitive to another provider's change in price than is self-care. A price change is more likely to push individuals to another provider type than to totally drop-out of the market.

Analysis into the impact of other household characteristics on the choice for private doctors, government clinics and government hospitals shows that the influences are likely to have varying effects.

The demand for a private practitioner is shown to be highly influenced by sex and the composition of households to which the individual belongs. Males are more likely to seek care from a private doctor. Having more children in the household is likely to lessen the likelihood that care will be sought from a private doctor, while having more adults will increase that likelihood. Having more adults could imply higher earning capacities and the higher priced alternative is chosen: a private doctor.

Years of schooling and age influence the choice for a private doctor rather weakly. If these variables are considered as quality variables, given the endogenous treatment of quality in the model, then its significance for the private doctor equation suggests that education and age increases the expected productivity of private doctor care relative to the self-care alternative. The positive coefficient for education implies that education increases the perception of the relative efficacy of care from a private doctor. However, the negative sign of the age coefficient suggests that the older the individual the less likely will a private doctor be perceived as one of higher quality.

The 'age' variable may reflect more on the health status of the individual, such that adult health complaints, largely of the chronic type, are likely to be more costly from private sources, thereby lowering the probability of choosing a private doctor.

The same highly significant variables that influence private doctor choice also influence, albeit in opposite directions, the choice for government clinics. However, while being male would influence demand for private doctor positively, the influence is negative for government clinics. Males are unlikely to choose public clinics. The number of children has a positive and significant effect on the demand for care from public clinics, while the number of adults reduces the demand for this provider option. This may be due to the fact that the focus of activities in public clinics is mostly preventive care (maternal and child health, family planning, well-baby care, etc.) directed at mothers or children. Furthermore, public clinics are likely to be largely staffed by women. Understandably, having more children will likely increase the choice for public clinics, as they comprise the clinics' major target clientele.

The demand for government hospitals is strongly influenced by age and household age composition. The age effect is highly significant at one percent and negative. This is in direct contrast to our private doctor estimates. Older individuals are likely to seek care in government hospitals. Health complaints of an older individual are likely to require more medical skills which hospitals can provide and which can be provided more cheaply at a government hospital.

Having more adults and children influence the demand for public hospital care significantly as in the other provider types. However, the direction of the effects are both negative for public hospitals. Interpreted as a productivity factor, having more adults increases households earning capacities and, therefore, increase the preference

for private care as opposed to public hospital and clinic care. For the latter, adult chronic illnesses are likely to be more effectively served in hospitals than clinics. Having more children on the other hand reduces demand for both private and public hospital care but increases the demand for public clinics.

The non-significance of the health status variable, severity, is surprising. Health demand studies earlier cited (Akin, et al, 1984; Heller, 1986) show this factor to be highly significant even compared to economic factors. This may be due to the limits of our data which rely on self-reported morbidity and the individual's own assessment of the severity of his/her complaint. Furthermore, severity self-assessments may also interact with other factors which we were unable to capture. Compared to clinical-based health indicators, Behrman and Deolalikar (1988) makes this statement about self-reported measures of health status:

> ...Frequently, respondent-reported disease data are used as indicators, though such reports are likely to be determined endogenously by characteristics like wealth (p. 702).

4.3.2 The Degree of Responsiveness of Demand to Changes in Prices

This and the next sub-section presents the price and time elasticity estimates using the method discussed in Appendix 5. The results are discussed in the context of the immediate policy implications that flow from it. From the elasticities measured, one can make forecasts regarding the impact of changes in price on health care demand. In addition, estimating elasticities is a good starting point for further analysis on the revenue impact as well as welfare effects of these changes.

To examine the effects of consultation price on the utilization of medical care, across income class and provider type, arc price elasticities of demand were estimated.

Within an income group, only the price is allowed to vary, and within a price range, only income varies. Three levels of fee changes were examined. Table 4.4 shows the arc price elasticity estimates. Reading across a row shows the movement of price elasticities as income rises, holding prices constant. Reading down a column shows the price elasticities moving down the demand curve, holding income constant.

The general trend confirms the model's prediction that price elasticity of demand falls with income, i.e. the poor are more price sensitive than the rich. Our estimates show that for private doctor demand, lower income groups exhibit greater price sensitivity than higher income groups. Generally, however, health care demand is less than one, that is it is price inelastic, except for the lower income group at the highest fee levels. This implies that the demand of the poor is likely to fall when high fee levels are set.

For government clinics, however, demand is generally inelastic, such that price changes are unlikely to alter demand significantly. Government clinics are barangay health stations or rural health centres and they serve as frontline units for the government's public health care, mostly preventive, activities. The norm is for services offered at these levels to be free and exceptions to the norm are likely to be largely voluntary. The inelasticity in demand for public clinics may reflect the limited services offered in these facilities. Gertler and van der Gaag's (1990) study for adult health care demand in rural Peru yielded similar results. The trend of the impact across households is as expected, i.e. price elasticity of demand falls with income. The largest response appears for the middle income group, the group which are likely to move out of public clinic facilities towards private facilities. Demand for

Table 4.4
Arc Price Elasticities for Out-Patient Care

Price Changes (Pesos)	Income Classes 1 (lowest)	2	3	4	5 (highest)
Private Doctor					
0 - 50	-0.5153	-0.4365	-0.0235	-0.1737	-0.3640
50 - 100	-0.7693	-0.2017	-0.1122	-0.2258	-0.0002
100 - 150	-1.6515	-0.4506	-0.2383	-0.2380	-0.3528
Public Clinics					
0 -50	-0.0094	-0.0167	-0.0784	-0.0149	-0.0293
50 -100	-0.0204	-0.0362	-0.1657	-0.0298	-0.0556
100 - 150	-0.0216	-0.0378	-0.1771	-0.0303	-0.0562
Public Hospitals					
0 -50	-1.3123	-0.0345	-0.0203	-0.0190	-0.0087
50 -100	-2.0541	-0.0330	-0.0198	-0.0186	-0.0085
100-150	-4.4581	-0.0152	-0.0092	-0.0092	-0.0043
Mean Income (Pesos Per Month)	853	1,953	3,205	5,179	18,974

government hospital care by the poor is elastic, given changes in income and prices. The highest price elasticity is felt by the lowest income groups at the highest fee level, with public hospital out-patient services charging similar rates as private facilities. While across income groups, with prices held constant, price elasticity of demand increases as income levels decline.

The lower income group appears to be more price sensitive when it comes to using government hospitals than to using private doctors. The highest income group on the other hand exhibits the lowest price sensitivity for government hospital care relative to other provider types.

The differential response by income groups to price changes suggests that health care financing reforms, particularly those that intend to levy fees in government facilities, are likely to be regressive -- reducing the lower income groups' utilization of these facilities substantially relative to the upper income groups. If the objective of a user fee policy is to increase resources in public facilities that can be ploughed back for improved quality, then appropriate mechanisms need to be instituted such that charges for upper income groups, which showed inelastic demand for services from public facilities, are used to provide free care for the lower income groups who will most likely decrease their utilization of public health services if faced with increased charges. Such differential charging does not appear to violate equity principles premised on the notion that the financing of health care reflect the ability to pay.

The 'income' variable, net of the price of medical care, was introduced as an exogenous variable. If a severely ill patient is likely to seek greater medical attention or an accident or illness may reduce income, then the assumption of the exogeneity of income (consumption) introduces a simultaneity bias in the estimates. This bias is

likely to create a downward impact on estimated price and income effects, bringing them closer to zero. 'Price' is also entered in the demand model as a reduction in consumption and its effect is likely to bias the estimates closer to zero. Estimated price elasticities, therefore, should be on lower bounds of the true elasticities (Gertler, et al., 1987).

4.3.3 The Degree of Responsiveness of Demand to Time Costs

In purchasing medical care, not only monetary resources are expended but also the time available for home production, work or leisure. Travel time involves a loss on the part of the consumer, which can be quantified, by multiplying the time loss by the hourly wage rate. This serves as an estimate of the opportunity cost of time spent in seeking out-patient care. Time spent travelling reflects the location of facilities and signifies the distributional structure of or access to health facilities.

Estimates of arc time elasticities (shown in Table 4.5) were made across provider options and income classes by considering three travel time levels, with each range equivalent to hourly changes. Like the previous table, reading across the row reflects change in time elasticity as income rises and travel time held constant. Reading down the column reflects changes in time elasticity for increasing travel time, with incomes held constant.

The results are similar to the findings of Acton (1975) that the demand for public care is more responsive to travel time prices than the demand for private doctor care. The results of the study further showed that demand for the private doctor is more time elastic at higher travel times, for all income groups but most especially for the lower income group. The latter experienced drastic reduction in demand beginning at the second hour range.

Table 4.5
Arc Time Elasticities for Out-Patient Care

Arc Time Elasticities for Health Care Demand					
	Income Quintile				
	lowest				highest
	1	2	3	4	5
(mean income*)	852.65	1,952.86	3,205.01	5,179.31	18,974.61
Travel Time change (Hours)					
Private doctor					
0-1	-0.2315	-0.2070	-0.1780	-0.2062	-0.2047
1-2	-1.0517	-0.7256	-0.6421	-0.2530	-0.7002
2-3	-1.1884	-1.0902	-0.9694	-1.1230	-1.1545
Govt clinic					
0-1	-0.3798	-0.3101	-0.7364	-0.3348	-0.0597
1-2	-0.2416	-0.2551	-0.4866	-0.3420	-0.2124
2-3	-0.1616	-0.1711	-0.3266	-0.2315	-0.1070
Govt hospital					
0-1	-0.1312	-0.1813	-0.2069	-0.2134	-0.2988
1-2	-0.4730	-0.6473	-0.7451	-0.7748	-1.0618
2-3	-0.7088	-0.9700	-1.1162	-1.1606	-1.5908

* Mean income for each quintile is in pesos per month

Estimated arc time elasticities for public clinics are of greater magnitude than estimates of price elasticity. This confirms that for clinic demand, time serves as a rationing device. Given negligible or token pricing, the demand for the care offered in public clinics is largely determined by time costs, confirming a similar prediction by Acton (1975). The middle income group's responsiveness to changes in time costs is higher than that of both the lowest and highest income groups. This reflects wage or income effect, as the middle income groups are likely to be involved in wage-earning activities, and therefore experience the highest opportunity costs of time. The relative unresponsiveness of the highest income group relative to the lower income groups is probably due to lower demand for public clinics from this group. Only 4 percent of those belonging to the highest income group used public clinic facilities.

For government hospitals, time elasticity increases with income, i.e. demand is more time elastic for upper income groups. Public hospital care demand for the highest income quintile is more than double the elasticity of the lowest income quintile. And this responsiveness begins for the upper income group at relatively lower time range. The behaviour of this group is not unlike the lower income group's behaviour with regards to private doctor demand. The trend for the upper income groups is reflective, not only of wage impacts, but also of the fact that this group can afford private doctors and therefore would shift utilization to private doctors when public hospital facilities are at some considerable distance.

Compared to their price elasticities, the poor's responsiveness to time is of a smaller magnitude, implying that prices determine their demand for government hospitals more than time costs. For the highest income group, time is a more potent rationing device than prices for hospital care. The demand for public hospital care for

the upper quintile group is shown to be more sensitive to time costs than direct fee charges. This implies that for careful targeting of scarce public resources for hospitals, charging the upper income groups could largely be made for cross-subsidy purposes (to provide quality and affordable services to the poor) and not so much to build more hospitals. Public policy for hospitals can also include price discrimination in terms of location; charges in facilities found in provincial capitals may differ from charges in facilities found in districts or smaller municipalities. Our figures show that, of the government hospital users, only 9.2 percent belong to the lower income group while 11.7 percent are from the upper income quintile.

That longer travel time may reflect on the quality of the provider cannot be directly inferred from the estimates. But it can be surmised that access to higher quality care, usually in central and urban locations, may be restricted by longer travel time for patients coming from afar, that is, outside these centres. This introduces a bias to the estimates, but the unobservability of the quality variable in the model, where quality is considered an attribute of the health production function, rather than as a specific facility attribute, precludes certitude on the direction of bias.

4.4 Consequences and Policy Options

Information on the relative price and time responsiveness of different income groups provides valuable insights into the potential impact of health care financing reforms, particularly of pricing policies for public facilities. The impact on utilization and revenues, arising from price changes, can be estimated from the data. We can also estimate the level of income needed to compensate households for any welfare changes arising from a price increase. Indirectly, this indicates the minimum income

or subsidy levels that can support participation in some risk-sharing schemes to sustain or raise current levels of utilization.

The impact of alternative fees were estimated for urban and rural settings in the sample. The simulations emphasized the effects of changes in prices of medical care. This approach is considered appropriate in the light of the market-oriented nature of the health care market as well as our concern of linking our analysis to health care financing reforms, particularly directed at enhanced risk-sharing participation. To address the latter issue, the analysis focuses on current public utility users. They belong to an income range that are likely targets of risk-sharing mechanisms -- the second to the fourth quintile groups.

Some salient characteristics of these areas are shown in Table 4.6. We observe large differences between urban and rural areas. In terms of socio-economic conditions, urban households earned and had higher per capita budgets. There was higher per capita non-food consumption, compared to food consumption in urban areas. There were large differences in living conditions; with nearly 85 percent of urban dwellers, compared to 18 percent of rural households, reporting piped-water facilities. Flush toilet facilities were not as common to urban households as expected. Morbidity conditions were not widely different in the two areas, although nearly four times of urban dwellers, compared to rural dwellers, were shown to seek non-home care for illness complaints. Travel distance to the nearest health provider were not so much different for government clinics and private doctors in the two areas; although, it took rural households twice as long to get to government hospitals.

Table 4.6
Differences Between Urban and Rural Areas
Household Samples, Philippines

Urban-Rural Differences		
	urban	rural
	(N=2137)	(N=661)
Daily wage rates - pesos (ave. for commonest reported occupations)	205.78	129.96
Mean total expenditures (pesos per month)	6290.02	2581.19
Mean per capita food consumption (pesos per month)	602.84	212.11
Mean per capita non-food consumption (pesos per month)	678.2	217.15
Percent with Piped Water /a	85.4	17.5
Percent with flushed toilets	13.9	5.3
Percent with reported ill member(s)	57.7	53.9
Percent sought market care	38	10.2
Distance (in minutes) of nearest health provider		
govt clinic	20	24
govt hospital	21	47
private MD	26	24

a/ percent of households

Database: PIDS-DOH Household Survey

4.4.1 Utilization Impact

The price scenarios used private consultation prices as benchmarks. The base case price scenario assumed that public clinics and government hospitals charged zero fees. Scenario 1 assumed that government hospitals charge one-half the price of the private sector for outpatient services and clinics charge zero prices. Scenario 2 assumed that government hospitals charge the same rate as private hospitals and government clinics begin charging one-third of the price of private clinics. Scenario 3 assumed that both government facilities charged full private sector prices.

Table 4.7 shows the changes in the probabilities of seeking care and the estimated changes in utilization arising from the assumed price changes. For the urban areas, the probability of seeking care from a private doctor increases with each price change in the public sectors. Each price increase in the public sector lowers the probability of public facilities being utilized. In the rural areas, the same trend is observed. The probability of seeking care halved between the base-case and the highest-price scenario. It is observed that for both urban and rural areas, when government hospitals introduced charges, the probability of public clinic use is increased. But the reduction in the probability of public clinic use was much higher when public clinics introduced charges, compared with the change in consumer behaviour towards government hospitals.

The number of those seeking private doctor care for out-patient consultations in the urban areas doubles from the base scenario to scenario 3 reflecting a shift towards private doctor use when public facilities are charging the same fees as private doctors. The number seeking clinic care drops dramatically in the urban areas. Charges at the public clinic levels drive people to the government hospitals, even if

Table 4.7
Changes in Utilization Due to Price Changes

A. Probability Changes

Scenario /a	Urban			Rural		
	Private Doctor	Public Clinics	Public Hospitals	Private Doctor	Public Clinics	Public Hospitals
Base	0.268	0.221	0.257	0.247	0.182	0.255
Scenario 1	0.217	0.287	0.206	0.248	0.329	0.223
Scenario 2	0.216	0.192	0.237	0.205	0.189	0.223
Scenario 3	0.563	0.057	0.152	0.298	0.079	0.105

B. Changes in Actual Number of Consumers

Base	545	451	524	504	370	520
Scenario 1	442	585	419	505	672	455
Scenario 2	440	391	484	418	386	454
Scenario 3	1,148	115	310	607	161	215

a/ Scenarios refer to:
Base: zero prices in government facilities
1 : Public hospitals charge 1/2 the rates of private doctors; public clinics zero charge
2 : Public clinics charge 1/3 of the rates of public doctors; government charges the same rate as private doctors
3 : Public out-patient prices are the same as private doctor prices

public hospitals charge as much as the private facilities. That over-all utilization in the urban areas did not show a decline with the introduction of user charges suggests that income conditions of households can support such change. In the rural areas, however, price policy changes in government hospitals bring down utilization drastically. The introduction of fees in government facilities can shift utilization toward public clinics so long as these clinics do not impose fees. Fees at public clinics level, however, are likely to bring down utilization. Since the number seeking care from private doctors did not increase (in fact it dropped by 21%) when public clinic prices increased, we can assume that the 74% drop in clinic utilization dropped out of the market into self-care. Figure 4.3 illustrates this utilization response in the two areas.

4.4.2 Revenue Impact

The estimated revenue changes arising from price changes in public facilities are shown in Table 4.8. The over-all impact of these price changes in the public sector was estimated to increase revenues in the private sector. In the urban areas, the dramatic drop in public clinic demand and the resulting shift towards public hospitals would have doubled the latter's revenues. The increase in public clinic revenues as a result of charging would have been much less than the increase in the revenues brought to public hospitals.

The impact of public charges on private facilities' revenues in the rural areas was much less than in the urban areas. The revenue increase for government hospitals in the rural areas was much higher than their counterparts in the urban areas for the first price level change. But while for urban public hospitals revenues increased thereafter, revenues for rural public hospital tend to fall. This is due to the high drop-

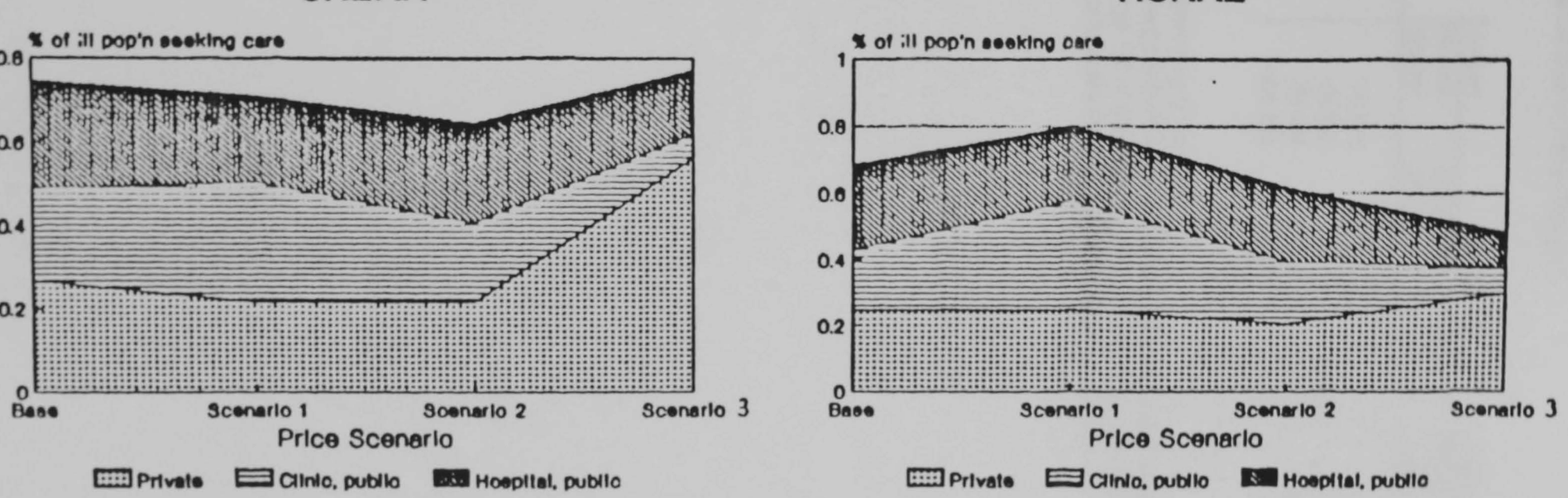


Figure 4.3 : Impact of Changes in Prices on Utilization

Table 4.8
Changes in Total Revenue Due to Price Changes

	Urban			Rural		
Scenario /a	Private Doctor	Public Clinics	Public Hospitals	Private Doctor	Public Clinics	Public Hospitals
Base	73,245	0	0	59,803	0	0
Scenario 1	59,335	0	28,148	59,997	0	30,530
Scenario 2	59,089	17,496	65,003	49,683	15,261	53,871
Scenario 3	154,183	15,498	41,619	72,127	19,103	25,495

a/ Scenarios refer to:
Base: zero prices in government facilities
1 : Public hospitals charge 1/2 the rates of private doctors; public clinics zero charge
2 : Public clinics charge 1/3 of the rates of public doctors, government charges the same rate as private doctors
3 : Public out-patient prices are the same as private doctor prices

out rate from the health care out-patient market in the rural areas.

4.4.3 Welfare Impact

Economists interpret welfare changes arising from price changes as a willingness to pay measure. Economic models assume that price changes bring about a change in consumer welfare. To restore the consumer to his or her original welfare position before the price change, he/she must be compensated or have his/her income taken away. This income adjustment measure is known as compensating variation (CV). CV is interpreted as the amount of income that an individual must earn or be paid to make him just as well off after a price change as before the change. A negative CV means the consumer becomes worse off because of the price change and must receive transfers to make him/her as well off with the new prices as he was with the old (Gravelle and Rees, 1992). In as much as we dealt with price increases in the public sector, the CVs estimated were negative(Table 4.9) and indicate welfare losses for consumers as a result of charges at public facilities.

We observe that price changes in public facilities result in individuals being generally worse off. The impact, however, falls in varying degrees on the users. Users at the public clinics require much less compensation than at the public hospitals. This is probably due to the limited services offered at these facilities. For a subsidy of slightly less than 200 pesos, urban consumers get back on the same welfare level. Rural clinic users experience greater welfare loss for equal pricing (i.e. same prices as private facilities) at the clinic level and would, therefore, require a slightly higher subsidy to prevent the households from leaving the market.

Equal pricing of public hospitals with private doctors, and one-third pricing at the clinic levels, is the worst position among three scenarios and require the highest

Table 4.9
Estimates of Welfare Loss:
Compensating Variation
(Pesos Per Visit)

	Urban		Rural	
Scenario	Public Clinics	Public Hospitals	Public Clinics	Public Hospitals
Scenario 1	0.00	-300.86	0.00	-361.61
Scenario 2	-186.79	-694.79	-180.26	-638.08
Scenario 3	-165.46	-444.85	-225.64	-301.98

Scenario 1: Public hospital out-patient prices are 1/2 of private doctor prices
Scenario 2: Public hospital out-patient prices equal to private doctor prices; public clinics charge 1/3 of private doctor prices
Scenario 3: Public facilities charge the same rates as private doctors

compensation levels, especially among hospital users. As these compensation levels indicate the amount needed to keep current users in a position where they are assumed to be better off before the price change, the price of the alternative, i.e. dropping out of the market, is high for society. The lower compensation levels at price scenario 3 indicates an adjusted welfare position and subsidies needed would be lower for those who can just as afford private market prices.

These compensations payments are unlikely to be made. One can, therefore, view these income adjustments or subsidies, as a percentage of total household and non-food budgets to yield insights into the burden of pricing reforms or the affordability of public facilities after some pricing reforms. Simplifying the pricing reforms into minimum price change (government hospitals charge one-half the price of private) and maximum price change (equal pricing with private facility), Table 4.10 shows the impact of these income adjustments on household budgets. Based on average household expenditures, we classify the users into three income groups. Minimum price changes translate to a reduction of 4.84 to 7.96 percent of household budgets; while maximum price changes would mean adjustments between 4.69 to 9.97 percent of household budgets. As a proportion of non-food budgets, the relatively well-off income groups' loss would comprise 8.66 percent compared to the relatively poorer groups' loss which comprise 13.46 percent at the minimum price changes. Maximum price changes translate to higher levels of losses, with the subsidy needed falling at higher income levels. Should these subsidies not materialize, we can reinterpret these percentages as the proportion that households must pay out of their budgets in order to remain in the same welfare position as they were in prior to the price increases.

Table 4.10
Compensating Variations As Proportion of
Household Expenditures and Non-Food Budgets
(Percent)

Mean Incomes (Pesos Per Month)	As Proportion of Total HH Expenditures		As Proportion of HH Non-Food Budgets	
	Lowest Price Change	Highest Price Change	Lowest Price Change	Highest Price Change
< 2,000	7.96	9.97	13.46	16.84
2,000 - 3,200	5.3	4.69	12.33	10.92
3,300 - 5,000	4.84	7.16	8.66	12.81

Of course, our analysis assumes that the pre-price change welfare situation of individuals was preferred, such that compensation that is sufficient for their new position, or brings them back to the pre-price change position, would be desirable. In the case of health care utilization, we cannot speak with confidence that this is so, without additional information on other health conditions in the area and medical opinion on the appropriateness of the level of care. The different responsiveness of different income groups to price changes showed that subsidies or compensation resulting from a price change would cause an income effect, such that a reversal from the present new position to the old one before the price change is unlikely to yield improved outcomes (Gravelle and Rees, 1992; Just, et al., 1992). Since no compensation is deemed feasible to yield welfare-enhancing outcomes, then alternatives must be sought, particularly through risk-sharing schemes, to respond to price changes brought about by user charges in public facilities.

4.5 Conclusions

The health care demand model, following Gertler and colleagues' specifications, applied for the first time in the Philippines, showed that prices and income significantly influence demand for out-patient care. This finding contrasts with the widely-known study by Akin, et al. (1985), using Philippine household samples, which concluded that economic factors did not affect health care demand significantly. The strength of the Gertler model of health care demand lies in its consistency with utility maximization, enabling an empirical specification that captured the differential price response across income groups and provider types. The results showed that price increases are likely to lead to a greater than proportionate reduction in demand, especially for the poor.

Price changes in government hospitals are likely to have greatest impact on the poor. Inasmuch as the majority of government hospital users are not likely to be the very poor, careful targeting in pricing policies can allow public facilities to impose sliding fee schedules. The differing price elasticities suggest that price discrimination can yield desirable outcomes, especially if those with relatively price inelastic demand are charged fully, compared to those with relatively price elastic demands.

That the poor were more price-sensitive than the rich was similarly observed by Ching (1992; 1995). But how the reaction to demand for a specific out-patient provider alternative would vary with changing prices of medical care across alternatives was not captured by point elasticity estimates undertaken by Ching (1995). Furthermore, the differential response by income groups to access time to providers has not been earlier estimated for the Philippines. This study estimated differential time elasticities across income groups. The greater responsiveness of the lower income groups to price rather than time changes suggests that revenue increases from user charges should be directed, less at further building of public units to bring them closer to patients, and more towards improving efficiency in public facilities to lower prices.

While user charges in public facilities are often justified to promote quality improvements (see for example, World Bank 1987), the Gertler model cannot make definitive conclusions regarding the effects of price changes on quality. Even as the price effects were modelled to be adjusted for quality, with quality incorporated in the health production function as attributes of both household and provider, the unobservability of quality does not measure the sensitivity of consumer demand to various quality of services. Therefore, the nature of quality improvements that

consumers are willing to pay for cannot be deduced from the model (Lavy and Germain, 1994).

The feasibility of charging differently by income groups has been questioned by some authors (McPake, 1993; Gilson, 1988). In recognition of this problem, the policy options explored utilization, revenue and welfare effects of user charges in urban and rural areas, to provide alternative policy handles. The model used captured the differential impact of monetary and non-monetary access costs across income groups, where households located far from facilities were hypothesize to incur higher access costs, even if services were free. Time could serve as a rationing device in these cases. However, income was modelled as affecting utility through the consumption term, with the money and time price of medical care reflecting foregone consumption. Variations in demand through locational differences were therefore captured through differential access costs. Simulations showed that the rich were observed to be more sensitive to time, despite closer accessibility to facilities, reflecting higher opportunity costs of time. These results suggest that public facilities in centrally located areas could impose positive charges without fear of reduced utilization. In the urban areas, the simulations showed that price changes did not lead to over-all reduction in utilization. There appeared to be a shift in utilization from public to private facilities. But in the rural areas, price changes were likely to impact negatively on utilization.

The demand function estimates were used to derive welfare effects in terms of willingness to pay or compensating variations. The study's estimates showed that if public hospitals' out-patient departments were to charge one-half the price of private doctors, the welfare loss would less than 10 percent of the household budget of the lower income groups. Households can be compensated for welfare losses arising from

the charges by improvements in services that will lower prices to keep welfare constant. Efforts must also be directed towards cushioning the financial loss through some risk-sharing schemes. Participation in such schemes should comprise no more than between 5 to 10 percent of household budgets, a proportion that may currently exceed household budgets for health care. Or alternatively, the public support needed for subsidies or assistance in risk-sharing schemes should amount to such levels. The Gertler model applied in this study could not assess differences in risk-taking behaviour and attitudes to risk by households, as the model abstracts from the presence of uncertainty, a major limitation in the light of the inherent characteristics of health and health care.

Demand analysis provides only a partial perspective of the complex interactions in health care. This chapter explored household health-seeking behaviour and responsiveness to changes in prices. The policy suggestions that flow from it must be viewed within a broader perspective of the organization of the health care market. The feasibility of user fees, for example, cannot be directly gleaned from the estimates. But the demand parameters can inform on the extent at which changes in conditions, which lead to price increases or other policy reforms, can shape the structure of the market in health care. This is the subject matter of chapter 6. Considerations of the structure of the market, however, requires information on the behaviour of the supply-side and the nature of the cost structure of health services. This is explored in the next chapter.

Chapter Five

Conditions of the Supply of Health Care in the Philippines

Introduction

This chapter examines the economic characteristics of the supply-side of health services in the Philippines. The chapter is divided into four parts: part one sets out the framework for the analysis in terms of the theory of supply; part two describes the distribution of health facilities, manpower, hospital equipment and assets throughout the country; the third part describes the organization of outpatient care; and the fourth part describes the data base and discusses the results of studies of cost functions and structural estimates of economies of scale and scope of hospital services.

Since the ultimate objective of the study is to identify the structure of the health care market, this part of the study provides the supply-side parallel to the previous analysis of demand. The econometric estimates presented in this chapter rely on the results of studies from the PIDS-DOH programme earlier cited in Chapter 1. The results are compared with the findings from estimates of the hospital production functions in other developing countries.

5.1 A Review of the Theory of Supply

5.1.2 The Production of Health Services

The analysis of supply focuses on the production of health care from the perspective of a 'firm'. Provider-firms, either physician clinics and hospital services, serve as basic units of analysis. This study examines supply-side postulates for hospital services, specifically their production and cost functions. Production occuring in physician clinics are presumed to parallel that of hospital production, albeit using

smaller amounts of inputs (Cullis and West, 1979). The analysis is simplified for the Philippines by the fact that most hospitals in the country began as single proprietorship firms, with the physicians as *entrepreneurs,* and largely remain so. This provides, for the analysis, what Gravelle and Rees (1992) call,

> ...The essential feature of the 'classical firm',..a central figure, with whom all contracts are concluded, and who controls and directs in his own interests, subject to constraints arising out of the terms of the contract he has made (p.167).

Supply-side analysis is an examination of production decisions within the given objective of minimizing costs. Cost-minimization as the objective function often needs to be qualified for health service firms. Some authors (Newhouse, 1970; Pauly and Redisch, 1973; and Harris, 1978) argue that providers pursue several goals. Newhouse (1970) suggests that hospital decision-makers try to maximize a combination of quality and quantity of services provided; with the bias towards quality, especially as it involves investments in costly technology. Pauly and Redisch (1973) modelled the economic motivation of physicians as the maximization of their personal income, even in the context of hospital-firms for which they are neither administrators nor salaried personnel. This behaviour results in the "application of non-physician labour and capital in physician-income-enhancing ways, ... to lead to "too high" quality (Ibid., p.99). This same behaviour is likely to lead to "small sizes" among physician-firms.

Harris (1976) expounded on the administrator-firm and doctor-firm dichotomy to explain the expansion of hospital size as part of the battle for 'defensive capacity margins'; enhancing utilization and quality (Cullis and West, 1979). Barnum and Kutzin (1993) cites that two-firm models may not be appropriate for many hospitals in developing countries where administration and service staff functions often overlap considerably.

These various perspectives' view on hospitals' production functions as being shaped by multiple objective functions of major players, point to the issue of the control over the residual income or profit. However, given the nature of ownership of production facilities for hospital and physician-firms in the Philippines, single proprietorship offers the opportunity to examine profit-orientation as the main motivation. While private firms are often distinguished between profit and not-for-profit organizations, no such distinction is made among health service firms in the Philippines. Single ownership implies that the physician-owner has direct control over the firm's residual income or profits, the excess of revenue after payments for inputs over and beyond returns for his or her own productive services. The framework provided by the traditional theory of the firm may be applicable.

Under the standard framework, the firm's production function defines the technical constraints on production decisions; i.e. the maximum output that can be generated given the input combinations. The opportunities posed by technological developments determine the feasibility of providing or expanding the scope of services. Rapid technological developments are noted in the medical sector. The nature of the technology of hospital services in the country is briefly discussed in sub-section 5.2.3.

The difficulty of measuring the ultimate products of health service firms: better health, prevent direct estimates of production functions (Phelps, 1992). Under organized settings, the improved health outcome arising form intervention or treatment, is not measured. The common approach is to examine the relationship of inputs to intermediate health service output, like number of discharges or hospital days, in terms of their costs. The analysis of 'cost functions' provide the basis for examining the efficiency of health services. An overview of hospital cost analysis is explored in the

next section.

5.1.2 An Overview of Cost Analysis

The structure of costs in the production of hospital services forms an important component of supply-side discussions. The studies explored here yield results about hospital behaviour and costs and provide information about the efficiency of hospital services in the country.

An analysis of hospital costs yields estimates of the determinants of these costs, or the underlying production technology. The cost function shows the relationship between costs of hospital services and its outputs, input costs and quality of services. Cost functions are estimated with hospitals shown to minimize costs, with total, average or variable costs, serving as endogenous variables. Exogenous variables considered include input prices, hospital outputs, and other measures capturing capital stock and quality. Standard cost theory predicts that as outputs, inputs and quality increase, costs should increase. The positive relationship between costs and these determinants is self-explanatory. However, the relevant cost measure and the functional form needs to be clarified.

Barnum and Kutzin (1993) reports that earlier hospital cost function studies (Anderson, 1980; Feldstein, 1968; Mann and Yett, 1968), have used average costs as the dependent variable, against a set of explanatory variables specified not from a structure based on theory but for convenience of estimation. Average cost formulation avoids the risk of heteroscedasticity. Heteroscedasticity is an estimation problem which occurs when there is non-uniform variance in error terms; for example, when the error term is correlated with hospital size. This problem appears in total cost formulations (Barnum and Kutzin, 1993). Recent estimates, however, use total hospital costs as

the dependent variable and avoids heteroscedasticity through the use of flexible functional forms for estimation.

The work by Zingapan (1994) discussed in Section 5.4.2, uses total cost as the dependent variable and a Cobb-Douglas formulation and therefore encounters the problem of heteroscedasticity. The Cobb-Douglas formulation was also shown to be inappropriate to multi-product firms such as hospitals because the specification assumes specialised functions (Cowing and Holtman, 1983). Frank and Taube (1987), however, showed that the Cobb-Douglas model performed just as well as more complicated models. This chapter cites both Cobb-Douglas and flexible functional formulation applied to cost function analysis of Philippine hospitals. A translog production function model from the same data set was made by Alba and Bugayong (1993) where some 44 explanatory variables, including interaction terms, were used in an average cost formulation of the hospital cost function. This study's estimates of economies of scale and scope is presented in Section 5.4.3.

The ultimate objective of estimating cost functions is to obtain information on the determinants of hospital costs and the importance of economies of scale and scope. Economies of scale (EOS) measures the effect on costs of an increase in output; given that output mix is the same while all inputs are allowed to vary. In this sense, EOS is technically a long-run cost concept given that the scale of operations can only be varied with time. Data limitations, however, allow only short-run cost function estimation. However, so long as the relevant cost function estimated is a variable cost function and a capital proxy (e.g. number of beds) is included in the independent variables, an index of long-run economies of scale can be derived from short-run variable cost functions (Barnum and Kutzin, 1993). What is being examined,

therefore, is the effects on costs of movements along rays from the origin in output space (Gravelle and Rees, 1992). An estimate of the index of ray EOS that is greater than one implies that economies of scale exist; if less than one, diseconomies exist.

Given that hospitals are multi-product firms, economies of scope on the other hand can show whether it is cheaper to produce outputs jointly or separately. If joint production is less costly than separate production, then economies of scope are said to exist, and the estimated value should be greater than zero. If the output vector can be produced as cheaply in separate specialist firms as in multi-product firms then the estimated value would not significantly be different from zero and economies of scope can be said not to exist. As in the discussion on EOS, scope economies were expressed as a ray.

A concern of this study is to determine whether public hospital costs respond to changes in output or input prices given that hospital budgets are fixed by budgetary allocations. However, budgetary allocations differ depending on the size of facilities, staffing patterns and nature of operations (primary vs. tertiary; teaching vs. non-teaching). The hospital cost studies mentioned below (Section 5.4) take costs of public services to be endogenous.

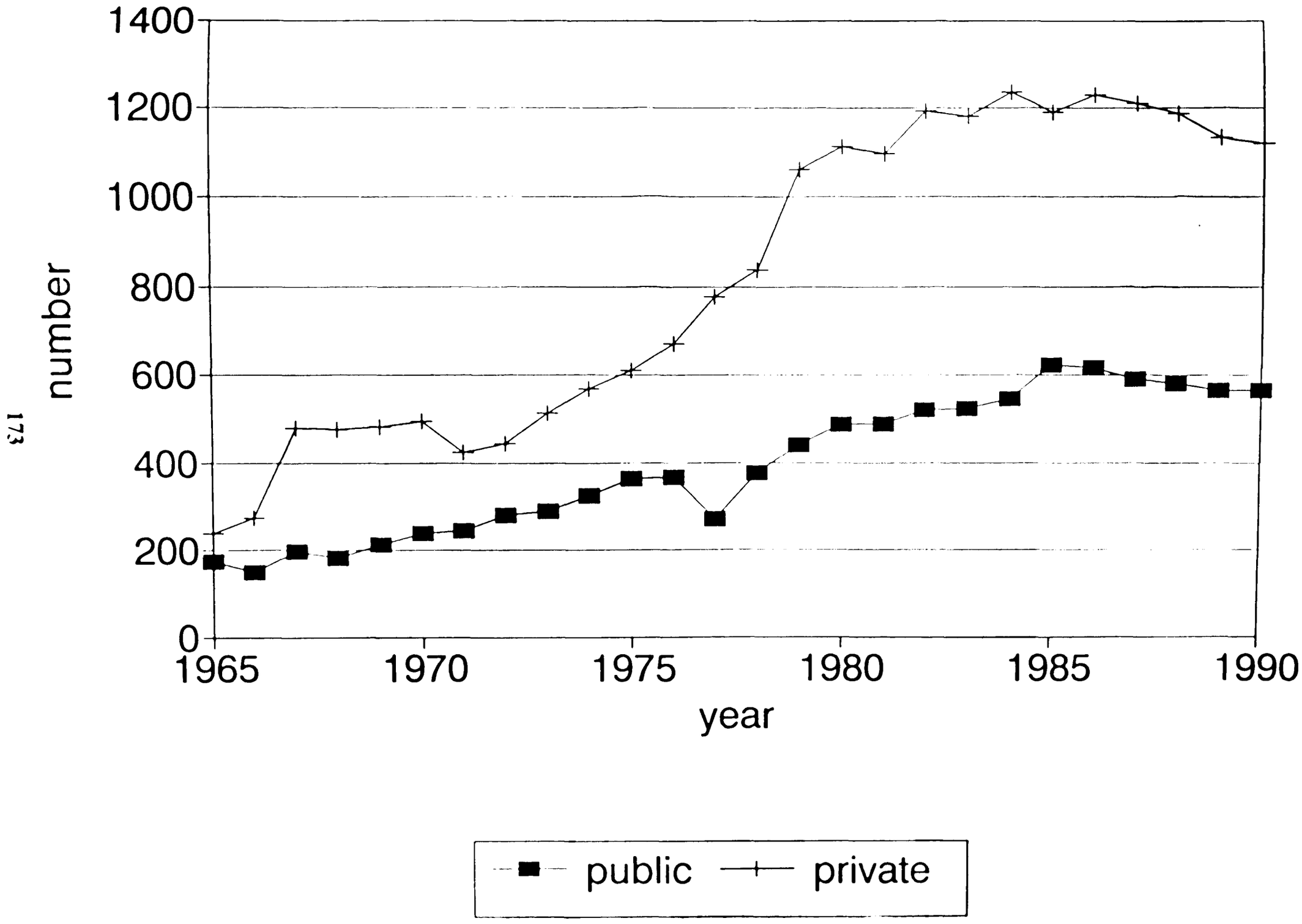
The next section examines the distribution of the resources of production, particularly facilities, manpower and equipment, to provide the context for the analysis of behaviour of firms in physician clinics and hospital services.

5.2 Distribution of Health Care Inputs

In the Philippines, the supply-side of the health care market includes not only public facilities but also numerous privately-operated health service facilities, pharmacies and health personnel.

Figure 5.1

Number of Hospitals



Source: NEDA - NSO, Philippine Statistical Yearbook, 1993

5.2.1 Facilities and Beds

Latest figures, for 1991, showed that there were 1,663 hospitals, of which 66 percent were private and the rest public. Figure 5.1 shows the growth in the number of hospitals in the country. The growth pattern showed that two sectors appear to be substituting for each other. Where there is a rise in private investments, public investments fall and vice-versa. There was a plateau for private hospital investments before the 70s, while public hospital investments rose slowly. Private investments rose steeply after the 70s, until about 1977. Thereafter the pattern of private hospital investments wavered, reaching a peak in 1984 and has barely recovered since. Hospitals in the country are classified into three service levels: primary, secondary, and tertiary. The distinctions are based on bed capacity, personnel and service units. These are shown below.

1. Primary hospitals - those with authorized bed capacity of 6-24; and with a minimum of a single physician for below 20-bed capacities and at least 2 registered nurses; rendering services in medicine, paediatrics, obstetrics and minor surgery.

2. Secondary hospitals - those with an authorized bed capacity of 25 to 99 beds with additional personnel requirement of pharmacist, dietician and technician; rendering services in gynaecology, general surgery, and medical ancillary services such as radiology and laboratory.

3. Tertiary hospitals - those with 100 beds or more with minimum seven full-time MD and 20 registered nurses; rendering services in the five sub-specialty areas above.

Table 5.1 shows the distribution of hospital facilities across regions of the country. Public investments in hospitals are concentrated, at 52.5 percent of total, in secondary level facilities comprised mainly of district hospitals. The distribution of public hospitals in the national capital region(NCR) is biased towards tertiary facilities. large teaching facilities and specialty centres, which comprise the apex of the public referral system. It is observed that regions 9 to 12, the southern parts of the country,

Table 5.1
Distribution of Licensed Hospitals, 1990
By Category of Health Care, by Regions

A. Distribution of Public Hospitals

Regions	Number of Hospitals			Total Public	Percent Distribution		
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary
1. Ilocos	6	17	7	30	3.9	5.8	6.3
2. Cagayan Valley	10	21	4	35	6.5	7.1	3.6
CAR	6	21	4	31	3.9	7.1	3.6
3. Central Luzon	6	37	8	51	3.9	12.5	7.1
4. S. Tagalog	20	28	10	58	12.9	9.5	8.9
NCR	2	9	28	39	1.3	3.1	25.0
5. Bicol	16	22	6	44	10.3	7.5	5.4
6. W. Visayas	12	29	9	50	7.7	9.8	8.0
7. E. Visayas	14	20	7	41	9.0	6.8	6.3
8. C. Visayas	12	29	7	48	7.7	9.8	6.3
9. N. Mindanao	15	18	4	37	9.7	6.1	3.6
10. C. Mindanao	17	18	8	43	11.0	6.1	7.1
11. W. Mindanao	11	12	7	30	7.1	4.1	6.3
12. S. Mindanao	8	14	3	25	5.2	4.7	2.7
Total, Public	155	295	112	562	100.0	100.0	100.0
% Distribution	27.6	52.5	19.9	100			

B. Distribution of Private Hospitals

Regions	Number of Hospitals			Total Private	Percent Distribution		
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary
1. Ilocos	38	22	6	66	6.1	6.5	4.5
2. Cagayan Valley	30	11	1	42	4.8	3.2	0.7
CAR	19	12	1	32	3.0	3.5	0.7
3. Central Luzon	53	51	10	114	8.5	15.0	7.5
4. S. Tagalog	51	59	19	129	8.1	17.4	14.2
NCR	28	49	39	116	4.5	14.4	29.1
5. Bicol	62	24	8	94	9.9	7.1	6.0
6. W. Visayas	13	7	10	30	2.1	2.1	7.5
7. E. Visayas	20	15	14	49	3.2	4.4	10.4
8. C. Visayas	11	12	2	25	1.8	3.5	1.5
9. N. Mindanao	33	14	2	49	5.3	4.1	1.5
10. C. Mindanao	72	25	7	104	11.5	7.4	5.2
11. W. Mindanao	130	19	9	158	20.7	5.6	6.7
12. S. Mindanao	67	20	6	93	10.7	5.9	4.5
Total, Private	627	340	134	1101	100.0	100.0	100.0
% Distribution	56.9	30.9	12.2	100			
Total, PHIL.	782	635	246	1663			
% Distribution	47.0	38.2	14.8	100			

Total Shares (%)	Primary	Secondary	Tertiary	Over-all
Public	19.8	46.5	45.5	33.8
Private	80.2	53.5	54.5	66.2

Source: Department of Health, Office for Hospitals

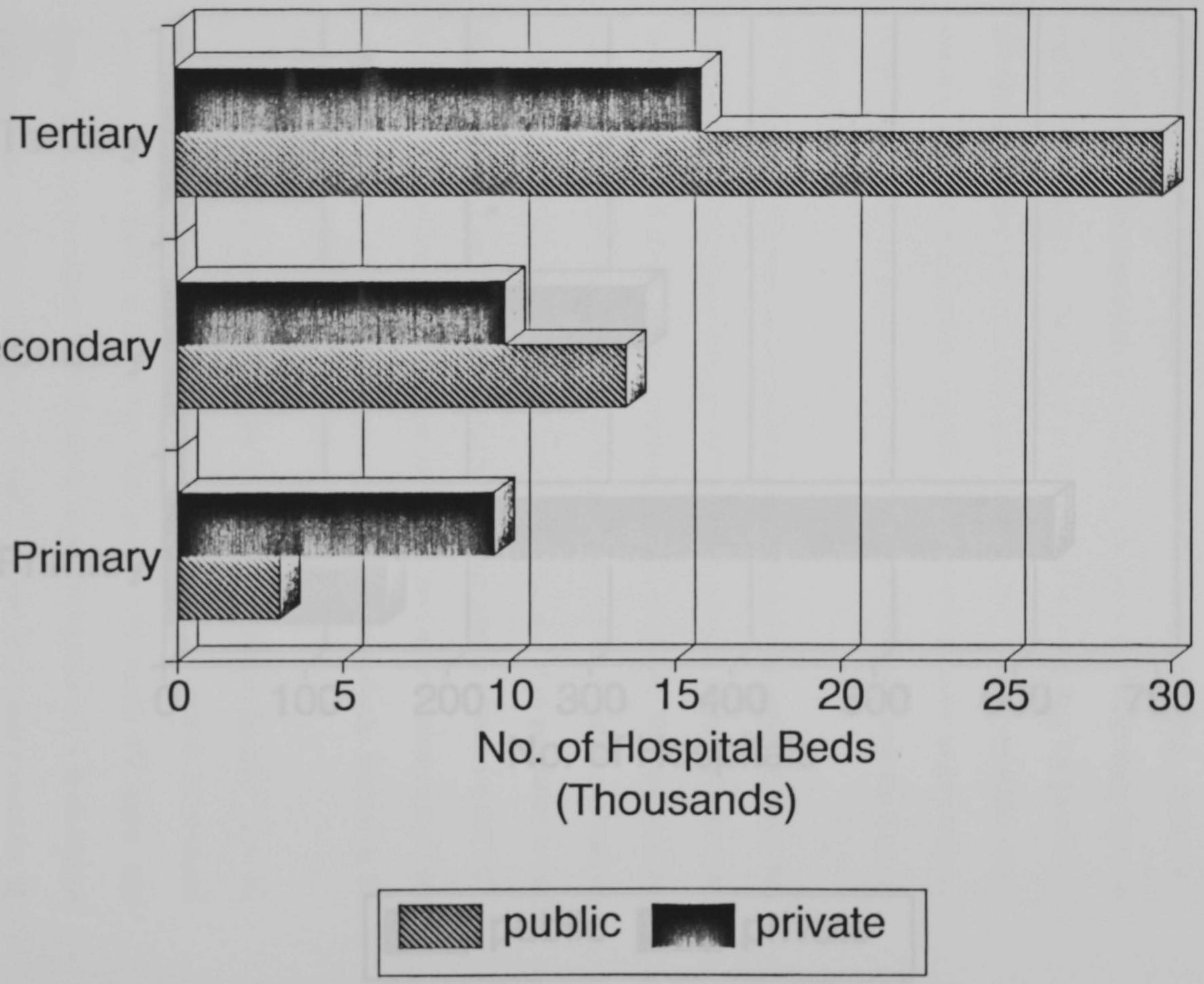
Population: NEDA-NSO, Philippine Statistical Yearbook, 1993

have a higher-than-average share (48 percent) in terms of primary facilities. Whilst secondary level facilities are more concentrated in the northern regions. No pattern can be discerned in the distribution of public tertiary facilities except for the high concentration in the NCR.

However, in terms of the number of hospital beds, the public sector dominates the private sector in the two higher levels. Figure 5.2 shows that public beds overwhelm secondary private beds by nearly 73 percent. The number of public tertiary beds are about double the number of private tertiary beds. Griffin and Paqueo (1993), with access to time series data, observed that government beds have expanded while private beds have contracted.

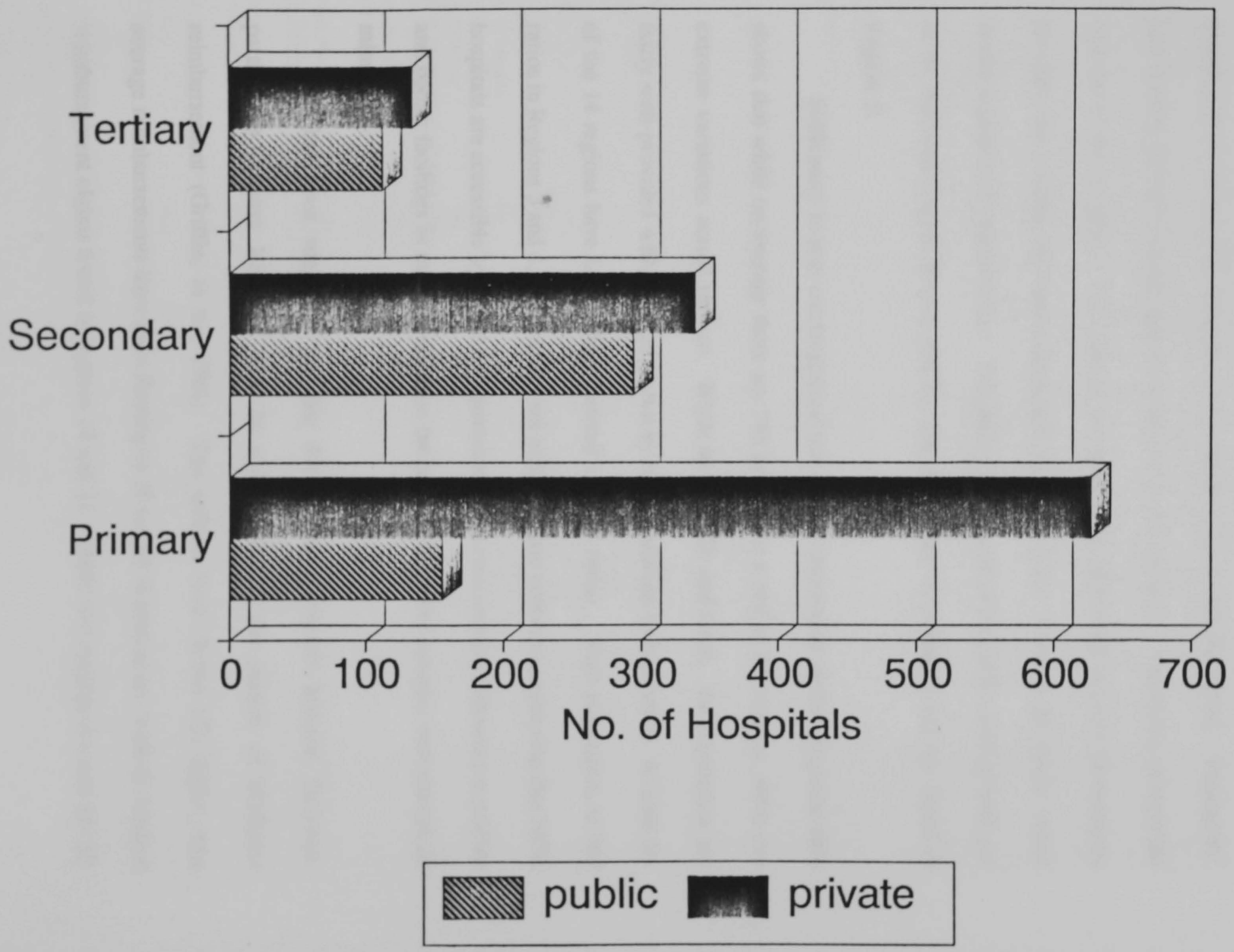
Private hospital investments on the other hand are largely concentrated in primary level facilities. Figure 5.3 shows that private primary hospitals out-number public primary facilities by a ratio of about 4:1. Private investments are largely concentrated in small primary hospitals; and the least on tertiary facilities. At the secondary and tertiary levels, private facilities outnumber government facilities by a smaller fraction. Across the regions, private investments in hospitals are high in regions 3,4, NCR, 10 and 11. Private tertiary hospital investments in regions NCR, 6 and 7 are about 2.5 times more than the national average distribution of private facilities. High shares of primary facilities are reported in the southern provinces. Nearly 43 percent of primary care facilities in the private sector are found in the farthermost southern regions of the country. That private sector activities are concentrated as smaller facilities is not surprising considering that they largely operate as single proprietorship or family-managed enterprises. Primary-level facilities are largely off-shoots of small outpatient clinics. Licensing standards are easily met by

Figure 5.2 : Number of Hospital Beds
By Hospital Category, Public-Private



Source: NEDA-NSO, Philippine Statistical Yearbook, 1993

Fig. 5.3: Number of Hospitals
By Category, Public-Private



Source: NEDA-NSO, Philippine Statistical Yearbook, 1993

husband and wife teams providing full-time services in medicine and nursing/pharmacy.

Across regions, private investments in primary hospitals were concentrated in the southern-most regions of the country (Table 5.2). The pattern of private investments is directed at small facilities (below 25 beds-size facilities). Secondary and tertiary private investments were biased in the northern, relatively prosperous regions of the country. This pattern of distribution of private hospital investments provides the country with more dispersed health services; whereas the public sector shows a pattern of concentration. Fifty-five (55) percent of all public tertiary beds are in the National Capital Region (NCR); and 22 percent of primary beds are found in Region 9.

Sufficiency in beds can be gleaned from bed-to-population ratios. Regional data shows that while on average there are 743 persons to a bed in the country, there are extreme variations across regions. While in the NCR and CAR, the population are fairly well-provided with beds, as shown by low population to bed ratios. At least six of the 14 regions have higher than national average ratios. High population to bed ratios in Regions 3 and 4, however are not really a cause concern considering that NCR hospitals are accessible by public transportation. The mean reported distance to private and public facilities in urban areas from the household survey sample, was around 20 minutes.

It has been suggested that the distribution of private hospital facilities, particularly primary hospitals, may be correlated with the pattern of Medicare reimbursement (Griffin, et al., 1994). The authors have shown that higher than average reimbursements have been flowing to 16 out of 76 provinces, with the highest reimbursement claims found in regions 10 and 11. These two regions account for 32

Table 5.2
Regional Distribution of Hospital Beds by Category
and Population to Bed Ratios
1990

A. Distribution of Public Hospital Beds

Region	Primary	Secondary	Tertiary	Total Public Beds	Population to Bed Ratio	Percent Distribution Primary	Secondary	Tertiary
1. Ilocos	100	550	1,150	1,800	637	3.2	4.3	3.7
2. Cagayan Valley	138	775	800	1,713	2,073	4.4	6.1	2.6
CAR	80	750	650	1,480	774	2.5	5.9	2.1
3. Central Luzon	125	1,545	1,550	3,220	1,925	4.0	12.1	5.0
4. S. Tagalog	235	1,025	1,750	3,010	2,746	7.5	8.0	5.7
NCR	135	900	17,120	18,155	437	4.3	7.0	55.7
5. Bicol	375	649	1,150	2,174	1,799	11.9	5.1	3.7
6. W. Visayas	160	1,195	1,350	2,705	1,993	5.1	9.4	4.4
7. E. Visayas	242	1,675	1,275	3,192	1,439	7.7	13.1	4.2
8. C.Visayas	135	1,070	875	2,080	1,469	4.3	8.4	2.8
9. N. Mindanao	715	750	600	2,065	1,529	22.7	5.9	2.0
10. C. Mindanao	250	1,010	1,000	2,260	1,553	7.9	7.9	3.3
11. W. Mindanao	135	350	1,000	1,485	3,003	4.3	2.7	3.3
12. S. Mindanao	325	525	450	1,300	2,439	10.3	4.1	1.5
Total, Public	3,150	12,769	30,720	46,639	1,302	100.0	100.0	100.0
% Distribution	6.8	27.4	65.9	100.0				

B. Distribution of Private Hospital Beds

Region	Primary	Secondary	Tertiary	Total Private Beds	Population to Bed Ratio	Percent Distribution Primary	Secondary	Tertiary
1. Ilocos	497	756	466	1,719	667	4.9	7.4	2.6
2. Cagayan Valley	376	213	100	689	5,154	3.7	2.1	0.6
CAR	396	496	243	1,135	1,010	3.9	4.8	1.4
3. Central Luzon	608	1,158	780	2,546	2,435	6.0	11.3	4.4
4. S. Tagalog	620	1,416	1,494	3,530	2,341	6.1	13.8	8.4
NCR	463	1,703	8,232	10,398	762	4.5	16.6	46.0
5. Bicol	877	781	505	2,163	1,808	8.6	7.6	2.8
6. W. Visayas	244	250	1,545	2,039	2,644	2.4	2.4	8.6
7. E. Visayas	556	418	1,896	2,870	1,600	5.5	4.1	10.6
8. C.Visayas	104	330	225	659	4,636	1.0	3.2	1.3
9. N. Mindanao	425	386	125	936	3,374	4.2	3.8	0.7
10. C. Mindanao	1,160	763	625	2,548	1,378	11.4	7.4	3.5
11. W. Mindanao	2,657	840	1,180	4,677	953	26.1	8.2	6.6
12. S. Mindanao	1,206	762	469	2,437	1,301	11.8	7.4	2.6
Total, Private	10,189	10,272	17,885	38,346	1,583	100.0	100.0	100.0
% Distribution	26.6	26.8	46.6	100.0				
Total, PHIL.	13,339	23,041	48,605	84,985				
% Distribution	15.7	27.1	57.2	100.0				

Total Bed Shares (%)				Over-all
Public	23.6	55.4	63.2	54.9
Private	76.4	44.6	36.8	45.1

Source: Department of Health, Office for Hospitals
Population: NEDA - NSO, Philippine Statistical Yearbook 1990

percent of private primary hospitals in the country. Reimbursement claims from the 16 regions, from the private portion of Medicare - SSS, exceed the membership base by value-to-population ratios between ranges of 1.09 to 4.66. The average reimbursement value to population ratio for the country as a whole is only .80; without the high-claiming regions, the national average drops to .65. This pattern suggests that the Medicare system may be a vital source of financial viability for some private facilities.

5.2.2 Health Manpower

Table 5.3 shows that the population is fairly well-covered by nurses, physicians, midwives and the least by dentists. Their distribution across the country also indicates that the NCR has the most favourable population to personnel coverage followed by other fairly well-off regions in the country. Table 5.4 further shows that while nearly two thirds of the population are found outside Manila and the nearby Southern Tagalog provinces, a third to nearly half of health personnel are located in it. Midwives form the key staff at village level. The latest estimate showed dentists to be most concentrated, at 65 percent, in Metro Manila and environs, a reverse of trends more than ten years ago. Reyes and Picazo (1987) estimates showed that the majority of physicians (58 percent) were in the private sector and about 38 percent were employed by the Department of Health. The balance were found in schools and other government services. The government employed slightly more than half of the nurses and two-thirds of the midwives. Most dentists are in private practice.

More recent estimates by Gonzalez, et al. (1994), using the Medicare data showed that there were nearly 8,580 general practice physicians or about 38 percent

Table 5.3
Population Per Health Manpower*
By Region, 1987

Regions	Physician	Nurse	Midwife	Dentist
1	2,806	1,907	3,222	15,088
2	4,703	2,959	3,408	19,241
3	3,812	3,092	4,093	10,718
4	3,833	3,655	4,977	13,495
5	5,005	3,437	4,183	31,096
6	4,673	2,902	4,526	39,413
7	2,747	2,508	3,991	32,941
8	5,674	3,169	3,060	33,433
9	8,703	5,725	4,371	28,877
10	3,764	2,575	3,175	47,096
11	4,098	2,829	4,267	24,743
12	4,244	3,071	2,939	40,029
NCR	1,256	1,319	4,167	2,533
Phil, Total	3,135	2,559	3,926	10,799

* Health Manpower includes public and private health personnel affiliated with hospitals and health centers

Reference: Reyes and Picazo, 1989; Table 3

Table 5.4
Distribution of Selected Manpower in Manila and
Southern Tagalog Region Relative to the Rest of the Country
Various Years

Study	Percent of Population		Percent of Manpower	
	Manila & S.Tagalog	Elsewhere	Manila & S.Tagalog	Elsewhere
Physicians				
Assoc. of Phil. Medical Colleges Survey, 1970	23.0	77.0	45.9	54.1
National Economic & Development Authority, 1974	24.2	75.8	40.1	59.9
National Economic & Development Authority, 1977	24.6	75.4	39.2	60.8
Philippine Institute for Development Studies, 1987	25.9	74.1	32.0	68.0
Nurses				
Assoc. of Phil. Medical Colleges Survey, 1970	23.0	77.0	51.7	48.3
Philippine Nurses Association, 1980	25.1	74.9	42.7	57.3
Philippine Nurses Association, 1987	25.9	74.1	40.3	59.7
Philippine Institute for Development Studies, 1987	25.9	74.1	34.0	66.0
Midwives				
National Manpower Survey, 1973	23.7	76.3	25.6	74.4
Philippine Institute for Development Studies, 1987	25.9	74.1	22.4	77.6
Dentists				
National Manpower Survey, 1973		76.3	35.9	64.1
Philippine Dental Association, 1988	23.7	74.0	65.4	34.6

Reference: Reyes and Picazo, 1989, Table 3.

of total manpower. The next biggest group of specialists are obstetricians (5 percent), followed by paediatrics and internal medicine specialists. This suggests that there was a strong primary care sector, which given the largely preventable nature of diseases commonly reported for the country (as shown in Table 2.5) may be appropriate. In the absence of other measures of health needs, a direct comparison with the health conditions and the distribution of health specialists cannot be made. However, these estimates are from the Medicare accreditation list. Higher-level specialists were unlikely to benefit from Medicare, and hence would not seek accreditation.

The numbers of health personnel is attributed to the conditions of medical education in the country; and movement of personnel to overseas jobs. There are 27 medical schools. Nearly all of these are private. These schools admit some 4,400 new enrolees each year. The medical schools have a national association which sets quotas for freshmen enrolment. The Development Academy of the Philippines (DAP, 1993) estimates that there are about 3,000 new physicians licensed each year, of which about 400 are lost annually to overseas employment or permanent emigration. Nursing schools start with approximately 21,000 freshmen enrolment each year. On the other hand, 6,000 nurses are lost yearly to overseas employment or emigration. There are far fewer dentists enroling each year, averaging 2,700; about 1,400 enter the profession and only about 220 are lost to overseas work (Rodriguez, et.al., 1994).

5.2.3 Medical Equipment and Other Assets

Investment in physical capital other than beds is critical in health care given the rapid technical change that takes place (Phelps, 1992). Having noted the relative ease with which private primary facilities are set up by husband-wife teams or single medical proprietors, the extent of investments in fixed assets is of particular interest.

An asset is considered to be a fixed asset, and therefore involving fixed costs, when the costs incurred are independent of the scale of production. Considerable fixed investments, however, have the character of sunk costs which may serve to deter potential competitors from entering the market. Sunk costs are costs which cannot be recovered on exit. Sunk costs are incurred for investments that "produce a stream of benefits over a long horizon and can never be recouped" (Tirole, 1992; p.308). The more specific an asset is to a function, the more likely it is that an asset is sunk. Market structure analysis posits that the extent to which costs are "sunk" determine the structure of a market.

Table 5.5 shows that compared to public facilities, private medical facilities have considerably less capital investments and assets, just barely nine percent of the assets of the public sector. The low level of fixed assets in private medical facilities indicates that entry is unencumbered by huge investments, allowing many small facilities to operate side by side.

A closer examination of capital expenditures (Table 5.6, previous page), from primary- source data, shows that investments in vital medical equipment vary by size, measured in terms of bed-capacities. Only a third of primary hospitals and less than 20 percent of government facilities surveyed had x-ray or ECG machines. Yet, these facilities are allowed to perform minor surgery and general medical, paediatrics and obstetrics procedures. At the secondary hospital level, where general surgery, laboratory radiology and emergency outpatient services can be performed, not all facilities had X-ray or ECG machines that support the performance of such functions. X-rays machines were more common in public than private facilities, but ECG is more common among private secondary hospitals than public secondary hospitals. Tertiary

Table 5.5
Average Book Value of Fixed Assets
Public/private Medical, Dental and Other Health Services
in the Philippines
as of Dec. 31, 1988
(in Thousand Pesos)

	Public	Private
Land	487	8
Bldgs., Structures & Improv'ts	2935	131
Transport, Equipments	119	10
Machinery and Other Equipt.	1304	347
Other Fixed Assets	598	10
Total	5443	505

Source: 1988 Census of Establishments

Reference: S. Zingapan, 1994, p.7,8

Table 5.6
Bed and Equipment Profile
Government vs. Private Hospitals
Selected Provinces, 1991

Bed Size and Equipment	Public	Private
1. Primary Hospitals		
Ave. No. of Beds	16.72	17.07
Percent with :		
X-ray	16.67	39.29
ECG	16.67	39.29
Ultrasound	0.00	0.00
MRI/CT Scan	0.00	0.00
2. Secondary Hospitals		
Ave. No. of Beds	55.92	32.40
Percent with :		
X-ray	92.00	86.49
ECG	48.00	78.38
Ultrasound	12.00	24.32
MRI/CT Scan	0.00	0.00
3. Tertiary Hospitals		
Ave. No. of Beds	441.61	149.63
Percent with :		
X-ray	100.00	100.00
ECG	88.89	90.00
Ultrasound	72.22	90.00
MRI/CT Scan	11.11	30.00

Source of Basic Data: DOH-PIDS Hospital Administrators Survey

Reference: S. Zingapan, 1994, p.12

facilities have full complement of X-ray machines; but only 90 percent had ECG and ultrasound facilities. But 30 percent of private facilities reported MRI/CT Scan equipment compared to 11 percent in public tertiary facilities.

The extent of capital investment is determined as much by the nature of diseases presented at health facilities as by the availability of financial resources. As shown by earlier tables on health status (Table 2.4 - 2.5) as well as hospital discharges (Table 2.9), the majority of complaints were communicable diseases which are largely preventable. Their diagnosis would probably not require the latest most expensive medical equipment. From table 5.6, however, there are nearly as many tertiary hospitals with MRI or CT scan equipment, as there are primary hospitals with X-ray or ECG machines, and more than double the proportion of secondary public hospitals with ultrasound.

This trend of investment in relatively advanced medical equipment among tertiary facilities may imply the presence of non-price competition amongst hospitals. The nature of competition in hospital services is discussed further in the next chapter. Having modern equipment attaches some status or prestige to the facility, notwithstanding the costs of these inputs (Lee, 1971). The consumers themselves cannot fully judge service quality and, therefore, may use proxy variables such as modern diagnostic equipment. Hospital investment patterns reflect this presumption of consumer behaviour. Competition in the level of medical equipment among hospitals is assumed to drive costs up, increasing the price of medical care.

A profile on financing sources of capital expenditures by the private sector tends to confirm the limited capacity for expansion in the private sector (Table 5.7). The majority (66 - 99 percent) of those who made capital expenditures the year before the

Table 5.7
Financing Sources for Private Hospital Capital Expenditures
Selected Provinces, Sample Hospitals
(Percent of Hospitals)*

Source of Financing	Primary	Secondary	Tertiary
Borrowings	0.00	11.11	10.00
Internal Savings	71.43	66.67	90.00
Donations	14.29	5.55	10.00
Tax Exemptions	0.00	11.11	0.00

* reporting capital expenditures (a year before the survey): capital expenditures include machineries and other equipment, transport and related equipment, land, additional beds

Source: PIDS-DOH Hospital Survey

Reference: S. Zingapan, 1994., p.7

survey, had used internal savings to finance these expenditures. Those who borrowed from formal financial, as well as informal financial institutions, were reported by Zingapan (1994) to pay between 10 to 27 percent in interest. The utilization of internal savings reflects on the way that most of these hospitals started out, as family practices, and shows that expansion has not very much altered the family-style management structure (Griffin, et.al., 1994).

Donations comprise the next common source of financing, especially for primary hospitals. Tax exemptions (applicable to imports; local purchases are subjected to 10 percent value-added tax) were made use of by some secondary hospital facilities. By law all imports by private primary and secondary hospitals are granted duty-free privileges. Tertiary hospitals do not enjoy this privilege as they are largely treated as for-profit institutions. However, educational institutions are accorded tax-free privileges. This loophole gives the incentive to these private tertiary hospitals to open a medical, nursing or midwifery school to avail themselves of these tax privileges (Griffin, et.al., 1994). There is no data on the number of such institutions but this is a widely observed practice.

5.3 Private Out-patient Services

5.3.1 The Organization of Private Outpatient Services

The private out-patient care consists of two main types of practice, distinguished by the location of practice: hospital-based and independent clinic practice.

In hospital-based practice a physician is offered space in a building adjacent to a hospital The main advantage of hospital-based arrangements is the privilege to admit patients to the hospital. The offer generally forms part of an offer or invitation

to serve as consultant to the hospital. It is largely made on the basis of personal relations with hospital owners or through other persons known to them. The physician may pay rent plus an initial amount of practice rights. In some cases, these rights may form a basis of equity rights or ownership shares, especially for corporate hospitals. Physicians refused to divulge the amounts they had to pay to start-up hospital-based practices (Kraft, personal communication).

This personalistic basis of access to hospitals with high initial costs, appears to be similar to what Honigsbaum (1979) described to be the pattern in Britain before the National Health Service (NHS) was set up. Social class largely determined hospital access and choice of career. To quote:

> ...To reach the pinnacle of the hospital world before 1948 one had to go through a long, largely unpaid, apprenticeship and not many medical students could afford it. This was enough to keep the consultant class small and exclusive. Those who could not finance the process had to become GPs and that led them to regard the hospital world as something separate and distinct (p.318).

Self-regulatory practice by the professional groups, as shown in Chapter 2, Section 2.3.2, limits the number of specialist training posts. Specialist training from accredited hospitals provides the entry point for hospital access. But specialists themselves, given the self-referring pattern of health seeking behaviour in the country, may also practice independently.

Hospital-based practice is advantageous to the physician as it provides him with a base to earn income. Hospitals are highly visible places and therefore accessible. People often say they have been to the hospital when in fact they used a private clinic in or adjacent to the hospital. Hospitals, on the other hand, would find such arrangement ideal as it may maximize use of services and enhance their reputation which depends upon the physicians they attract to hold offices in the premises and to

serve as hospital consultants. As in the North American setting, cited by Evans (1983), physicians are

> "private businessmen who bring in the hospital's patients. ...physician and hospital are incompletely vertically integrated, with objectives that partly overlap and partly conflict, and with the power to influence each other's behavior directly rather than through arm's length exchange(p.66).

The second type of out-patient practice is non-hospital based or in an independent set-up. General practitioners are mostly found in this type of independent arrangement, where they live and practice closer to communities and/or near a hospital. Often, the place of practice is also the residence. This is how most small hospitals started. They start with a few beds and then expand. In small towns, physicians may integrate and operate a pharmacy in their practice. Although considered unethical in statutes of the medical profession, their presence in small towns are often justified by consumer demand. Patients cannot choose the hospitals they want except in cases of emergency. Physicians can only refer patients to hospitals where they have admitting privileges. For the patient, the choice of physician is also a choice of hospital. Those in independent practice, without visiting rights to hospitals, have to refer a patient to a consultant in the hospital before a patient can be admitted. In smaller cities and towns, open staffing is more common where independent specialists have access or visiting rights in private hospital facilities. Being known to the hospital owner or membership of a professional body is a minimum requirement for this arrangement. GPs usually have freer access to public hospital facilities. Although initially they have to provide credentials to the hospital chief.

It is not uncommon to find specialists with hospital affiliation also having an independent practice in some other place. It is fairly common for physicians to hold multiple clinics and hospital affiliations. From a sample of 383 physician interviews,

conducted by Kraft and Limpiado (1994), 49 percent reported having a single practice, while 48 percent reported having two to three clinics. Of the sample, nearly half (48 percent) reported hospital-based practice while the same number reported independent practice. One-fourth of the sample had a combination of hospital and independent practice. In an analysis of the productivity of physicians, Kraft and Limpiado (1994) observed no differences in productivity, as measured by the number of outpatient patients seen in a week, between physicians maintaining single or multiple clinics (Table 5.8). However, marked differences were observed in the number of inpatient cases seen in a week and the number of hospital affiliations. Those with five to eight hospital affiliations see more (nearly 1.5 times more) patients than those with just one or two affiliations. Hourly productivities in hospital-based clinics appear to be higher than independent clinics but the latter spent longer in their clinics and see more patients.

Kraft and Limpiado (Ibid.) observed that hours spent in a week in all clinics seem to decrease as the level of development of the region increases. And that the number of patients seen per hour is higher in richer areas, reflecting higher hourly productivities. That physicians in poorer regions work more hours than their counterparts in Metro Manila indicate several considerations. Either there is a trade-off of income for leisure, resulting in a backward-bending supply curve for labour as incomes increase, so that in richer areas physicians spend less time in clinics. Or physicians in richer areas delegate tasks to assistants; this maximizes their patient load and at the same time increases hourly productivity. Kraft and Limpiado's initial observations supported the latter supposition that higher hourly productivities are coincidental with higher non-physician costs.

Table 5.8
Productivity of Physician Practice

	Ave. No. of Patients Per Week	Hours spent per week	Patients per hour
Clinic Practice:			
Number of Clinics			
One	58.8	30.4	2.3
Two	55.3	30.9	2.4
Three	60.6	29.8	2.8
Four	57.8	38.3	1.5
Hospital Practice:			
Number of Hospitals			
One	7.5	9.1	1.4
Two	8.2	8.9	2.1
Three	10.8	16.3	1.1
Four	10.3	12.7	1.1
Five	11.3	6.3	2.3
Eight	12.0	8.5	2.1
Type of Practice:			
Hospital-based	30.1	17.7	2.6
Independent	49.5	29.4	2.2
Ave. Usual Fee (Pesos)			
Hospital-based	103.2		
Independent	62.1		

Source: DOH-PIDS Outpatient Clinic Survey

Adapted from Kraft and Limpiado, 1994. Tables 2.1-2.3

5.3.2 Pricing in the Out-patient Service Market

The first two columns in Table 5.9 show a profile of pricing in out-patient practice. The range of fees varies by region, specialty, and type of clinic. The richer the area, the higher the fees. The range in fees is widest in surgery, followed by obstetrics-gynaecology. General practice offers the narrowest price range. Independent clinics appear to be cheaper than hospital-based clinics. The third column in the table indicates that, on the whole, physician put substantial mark-ups, i.e. the proportion of fees which more than covers costs, on their charges. Figures above one show that average charges are more than double the non-physician service costs. Mark-ups are

highest for those with 6-10 years practice and those in hospital-based practices. The latter is likely because a higher proportion of patients are from the middle-income groups.

The perception of doctors as to the income class of their patients is shown in the middle columns. This assessment is important in so far as pricing decisions of physicians are based on this perception (Table 5.10). Some 74% of sample physicians reported that economic status of patients figure prominently in their decisions as to the price. The nature of complaint or illness figures next in the pricing calculus of physicians.

An indication of the market structure and the extent of competition can also be gleaned from table 5.9. Nearly 40 percent of physicians interviewed consider the fees of other doctors in their price-setting. Pricing behaviour is more extensively discussed in the market structure analysis in Chapter 6, Section 6.3.3.

Table 5.9
Outpatient Care Practice Profile
1992

	Ave. Min. Fee Pesos	Ave. Max. Fee Pesos	Ave. Usual Fee/Non-Physician Costs \1	Mean Proportion of Patients		
				Low Income	Middle Income	High Income
Region						
II Cagayan Valley	28.10	67.00	0.90	57%	31%	14%
VII Central Visayas	44.70	94.20	1.26	51%	38%	12%
X Northern Mindanao	47.90	78.70	1.21	46%	40%	13%
National Capital Region	74.40	125.20	1.38	38%	50%	13%
Specialty						
General Practice	34.20	66.00	0.95	61%	27%	11%
Internal Medicine	75.00	122.50	1.85	36%	49%	14%
Obstetric-Gynecology	67.60	119.40	1.59	35%	55%	13%
Pediatrics	60.40	107.10	1.32	41%	47%	12%
Surgery	66.80	125.70	0.93	42%	44%	14%
Years of Practice						
Below 5 Years	50.90	87.00	0.96	50%	39%	9%
6-10 Years	65.60	112.00	1.52	38%	50%	12%
11-15 Years	63.90	110.80	1.45	39%	48%	13%
16-30 Years	52.57	91.63	1.40	46%	40%	13%
Beyond 30 Years	72.50	131.65	0.91	52%	32%	13%
Type of Clinic						
Hospital-Based	75.80	136.80	1.49	35%	52%	13%
Independent	46.30	78.70	1.15	51%	37%	12%

1/ Non-physician costs include expenditures for rent, supplies, drugs, repairs, compensation for assistants, licenses, insurance, utilities and other overheads

Source DOH-PIDS Outpatient Clinic Survey

Adapted from: Kraft and Limpiado, 1994, p.34

5.4 Costs and Efficiency of Hospital Services

This section presents the results of studies on cost functions of hospital services in the country. The discussion is structured in such a way that the data set used and estimating method is described; followed by a discussion of the results of these studies. The section ends with a brief discussion comparing the results with hospital cost analysis undertaken in other countries and the limits of these studies.

5.4.1 Hospital-level Data Used

The data used in the studies reported below were from the Survey of Hospitals and Hospital Administrators of the Philippine Institute for Development Studies - Department of Health (PIDS-DOH). A description of the data set is discussed in Appendix 1, and a more complete description of the data set is made in Zingapan (1994). The regression estimates discussed in Section 5.4.2, are from a sample of 65 hospitals with complete information out of the total 159 facilities which responded to the survey.

All hospital-related information, such as information on costs, patients served, wages, case mix, insurance support and subsidies received (if any), and others, refer to the year previous to the survey, 1991. The survey was conducted in the latter part of 1992 and the annual reports for the previous year are usually completed by June of the following year. Average fee estimates, i.e. average fees for discharges or out-patient contacts, were not directly lifted from the survey but were generated from the revenue information from two major services, out-patient and admissions/discharge departments, and divided by the number of patients reported for each service. Out-patient departments include ancillary services.

Total operating costs were estimated to be the sum of all expenses, including

Table 5.10
Physician Bases For Setting Fees
Percent of Respondents

Bases	% Respondents
Economic Status of Patients	74.45
Depends upon Illness	40.66
Fee Structure of Other Doctors	39.01
Predetermined Fee Structure	29.12
Relationship with Patient	20.88
Room Accomodation	20.88
Self-Structured Fee	20.05
Cost-of-Living/Operational Expens	18.41
If patient has health insurance	17.86

Source: DOH-PIDS Outpatient Clinic Survey, 1992

Reference: Kraft and Limpiado, 1994, p.32

depreciation, interest, maintenance, and transportation. Average wage figures reflect the amount paid for salaries and wages divided by the total medical and non-medical full-time staff.

'Beds' refer to the actual number of beds (which may not coincide with the authorized bed capacities). The variable is used to represent a fixed input.

A case mix measure used was the ratio of the total number of surgery patients to the total number of patients reported by the hospital. Zingapan (1994) did not provide any explanation for this split. But the case mix measure can provide an indication of the types and complexity of cases treated in hospitals.

Data referring to characteristics of the population outside the hospital, i.e. average physician fees, average out-patient fees, other hospitals' bed capacity, average household expenditures, and other municipality-related information were estimated from other PIDS-DOH databases. These data sets include the Household Survey and the Out-patient Clinics (OPC) survey. Municipal average fees for physicians, for example, used the OPC survey which reported fees charged by physicians for in-patient visits, distinguished by type of accommodation of patients.

A discussion of measurement problems is made in the context of the interpretation of results. Section 5.4.5 discusses some of the limitations of the works cited here. Descriptive statistics on the variables used are shown in Appendix 6.

Table 5.11 shows the distribution of hospitals by ownership in selected regions of the country. Private ownership comprised 63 percent of the sample, followed by public ownership. Majority of private hospitals were managed as single proprietorship. Although a growing number of private hospitals were being managed as corporations. Such management structure makes the application of the single

Table 5.11
Ownership and Nature of Organization of Hospitals
Sample Hospitals from Selected Provinces

Nature of Ownership	Region 2	7	10	NCR	Total	Percent
A. Private						
Single Proprietorship	29	15	54	44	142	39.4
Partnership	0	0	0	1	1	0.3
Corporation	1	14	8	56	79	21.9
Missionary/Religious	0	2	4	2	8	2.2
Civic Organization/ Foundation/Cooperatives	0	0	2	1	3	0.8
B. Public						
National/local Gov't	34	27	32	32	125	34.7
Government Corporation	0	0	0	2	2	0.6
Total	64	58	100	138	360	100

Source: DOH-PIDS Hospital Survey

Reference: S. Zingapan, 1994, p.10

decision-maker in standard economic theory more straightforward. Single proprietorship is to be expected for the primary level operations which we have noted to feature most prominently in the private hospital sector.

5.4.2 Determinants of Hospital Costs

A study on hospital cost function using a sample of Philippine hospitals is pioneered by Zingapan (1994). The study estimates a total cost function for public and private hospitals using a Cobb-Douglas formulation. The model is specified as follows:

$$ln\ C = C_0 + C_1\ ln\ D + C_2\ ln\ O + C_3\ ln\ W + C_4\ ln\ B + C_5\ S + C_6\ E + u;$$

where:

C: total annual operating cost of the hospital
D: total annual discharges (inpatient)
O: total annual outpatient visits
W: total average monthly wage of hospital personnel
B: total bed capacity
S: ratio of total Surgery Department patients to total patients
E: dummy variable indicating presence of X-ray/ECG/ultrasound/CT scan/MRI
u: error term
$ln\ (\ )$: variable expressed in natural log

The equation was estimated simultaneously using three-stage least squares technique (3SLS), for government and private hospital samples. As shown in standard econometrics textbooks (see for example Greene, 1990; Kennedy, 1992) simultaneous equation models can be expected to yield biased and inconsistent parameter estimates. The problem of bias occurs when repeating the procedure would not yield close parameter values; while, the problem of inconsistency refers to the bias not getting any smaller with increases in the number of observations. The problem may be compounded by inherent characteristics of Cobb-Douglas formulations which make

restrictive assumptions when applied to hospital functions. Cobb-Douglas specifications assume the following with respect to the form of technology: a) that cost-minimizing levels do not depend on the level of output; and b) constant returns to scale, where a percentage change in inputs results in an equal percentage change in output (Frank and Taube, 1987). A Cobb-Douglas specification therefore assumes complete specialisation, a restriction that is inappropriate given the multiple products of hospital firms (Cowing and Holtman, 1983). These restrictions yield problems of identification, where restrictions on simultaneous equations model to 'identify' it, can raise doubts on the structural parameters (Kennedy, 1992). The use of 3SLS as the estimating technique is generally believed to yield consistent and more efficient estimators (Ibid.)

The results are shown in Table 5.12. A "Chow" test was undertaken to confirm that the regression made on the two sample sets yielded parameter estimates that were significantly different from each other. The cost function model explains 85 percent of the variations in hospital costs for both public and private facilities. These r-squared values compare favourably to the health services cost function analysis on Kenya by Wouters (1993). Using a similar Cobb-Douglas formulation, Wouters' estimates showed higher (.91) r-squared, suggesting correlation among independent variables (an estimation problem known as multicollinearity). This is a common problem for Cobb-Douglas models, as well as for cross-section data (Kennedy, 1992).

The dependent variable, total operating costs, included all hospital expenses for personnel, supplies, utilities, depreciation, interest, rental, repairs and maintenance and other costs normally incurred. The results showed that hospital services appear to be driving hospital costs. The coefficients for in-patient discharges were significant for

Table 5.12
Cost Functions for Sample Hospitals
1992

Function: Cobb-Douglas Production Function
Dependent Variable. Ln (Total Cost)

Independent Variables	Description	Government		Private	
		Coefficient	T-Values	Coefficient	T-Value
Constant		5.8646	2.09*	10.0276	1.29
Discharges	Log of Total In-patient Discharges	1.1048	3.20*	1.2557	2.49*
Out-patient Visits	Log of Total Out-patient Visits	0.3598	2.11*	-3.0618	-1.98
Wages	Log of Ave. Monthly Wages of Personnel	-0.1447	-0.53	1.8477	2.67*
Beds	Total No. of Hospital Beds	-0.336	-0.96	1.5339	2.43*
% Surgical Patients	Surgical Patients as A Proportion of the Total No. of Patients	0.8309	0.36	-4.982	-1.46
Equipment	(= 1, if hospital reports having X-ray, and other diagnostic eqpt. incl. MRI)			1.9397	1.64
R- Squared		0.8494		0.8448	
Number of Observations		33		34	
* Significant at .05					

Estimates of Marginal Costs (Pesos)

In-patient Discharges	3,015	1,458
Out-patient Visits	222	0

Source: Zingapan, 1994.

both public and private hospitals; while the coefficient for out-patient visits is significant only for government facilities. A percent change in in-patient discharges, increased costs by 1.10 and 1.25 percent, for public and private hospitals, respectively. The negative relationship between out-patient visits and hospitals costs, although insignificant, suggests two things: a) collinearity between the two hospital outputs; b) measurement problems on the number of out-patients. Out-patient care in private facilities are hard to track since there are no separate out-patient departments, unlike in hospital facilities. These problems were encountered throughout by Zingapan for private out-patient estimates.

No other variables appear to be statistically significant for the government hospital model. Private hospital total costs appeared to be positively influenced by 'average personnel wages' and hospital size, measured by the 'number of beds'. Both variables were significant and may suggest that private hospitals can reduce costs by reduction in these inputs. The effect of the number of beds on costs was interpreted by the Zingapan (1994) as:

> ...(implying) that private hospitals may be over-capitalized, i.e. their capital stock may be too large given their output levels (Wagstaff and Barnum, 1992). The literature on hospital investments in the U.S. suggests that this pattern could be expected from an industry where non-price competition is prevalent (p.40).

Larger private hospitals were, therefore, likely to charge higher fees to cover the higher costs of additional beds. Given that personnel and beds are inputs to hospital production, the greater increase in costs arising from an increase in inputs also signify private sector diseconomies. The issue of economies is explored in more depth in the Alba and Bugayong (1994) study which is examined in the next section.

The inclusion of the ratio of surgery patients was meant to control for case mix.

Facilities which have more use of surgery were likely to incur higher costs. There was no variation on this variable between public and private hospital facilities and the results showed that case mix did not significantly affect hospital total costs. The broad aggregation may, however, not have fully captured the way hospitals, public and private, handle their cases. Further disaggregation, even on the basis of common causes of admission like deliveries, for example, may have shown some variation. But as Alba and Bugayong (1994) noted in their use of the same data set, too may empty cells precluded further disaggregation into other service departments in hospitals.

The 'equipment' dummy variable was included to represent the quality of hospital provision. The failure to further disaggregate the basic equipment (i.e. x-ray machines) from the prestige equipment like CT scan and MRI may explain the lack of impact of the 'equipment' variable on costs. The 'equipment' variable was not included by Zingapan in the government cost function to improve estimates for the other equations in the simultaneous system.

Estimated marginal costs in the bottom part of the table reflect the measurement error in the private out-patient model. For in-patient discharges however, the higher estimated marginal cost of a discharge from public hospitals compared to private hospitals, suggests inefficiencies in public hospital operations. Public hospitals are generally larger than private hospitals. Zingapan argued that the high cost of additional patients in government facilities was due to the larger in-patient load of government hospitals relative to private hospitals. That this load was not reflected in the case mix variable again suggests that case mix may be insufficiently represented by the proportion of surgery patients over total patients, and that other indications of the types of patient cases handled, may be necessary. Literature in other countries shows

that public hospital facilities treat more serious cases than private facilities (Newbrander and Parker, 1992; and Bennett and Tangcharoensathien, 1993).

The zero marginal cost for private out-patients may also be related to the lack of significance of the variable in the estimates. This was attributed by Zingapan (1994) to the fact that there are no distinctly out-patient services rendered in private hospitals. In public hospitals there are separate out-patient departments handling a flow of patients either referred from other lower units of the public health hierarchy or walk-in. Out-patient services in private hospitals, on the other hand, are rendered through doctors' clinics situated in the hospital which function independently of hospital operations. Patients coming in for out-patient visits are passed on to the clinics. This may not be an entirely satisfactory explanation since out-patient visits were estimated from the output not only of out-patient departments but from other ancillary services (radiology, laboratory). The records in these services would show whether the tests were made for out-patients or in-patients. There appears therefore to have been a measurement error in the private hospital cost function model.

5.4.3 Economies of Scale and Scope

The other hospital cost function estimates in the Philippines utilized the same dataset as Zingapan's but used a different specification. Alba and Bugayong (1994) estimated a transcendental logarithmic (translog) hospital variable cost function. Translog estimates differ from Cobb-Douglas formulation by not imposing restrictive assumptions on substitutability of inputs, and is therefore considered to be more consistent with theoretically derived estimates (Cowing and Holtman, 1983). Alba and Bugayong were therefore able to make more detailed breakdowns of personnel inputs and types of facilities. Their study also provides the first estimate of economies of

scope and scale, using Philippine hospital samples. Variable costs were defined as the sum of hospital expenditures on labour or personnel services as well as drugs and medical supplies. Other expenses such as utilities, repair and maintenance, transportation and communication were not included as they were considered as part of fixed costs. The number of hospital beds was used as proxy for fixed inputs.

Table 5.13 shows average variable cost simulations by Alba and Bugayong (1994), using the estimated parameters on economies of scale and scope. These parameters were applied at the means of sub-samples for four types of facilities and for public and private hospitals. The share of drugs in variable costs hovered between 44 to 55 percent, with the balance representing the combined share of personnel. The nearly-even share of these two main types of inputs in variable costs does not support what is generally observed for developing countries where lack of availability of drugs would be more the norm (Mills, 1994). However, averaging may have masked the true differences.

The highest drug share was reported in tertiary teaching facilities. Drug costs comprised a larger share in private facilities than public facilities. The low shares of drugs in primary and secondary facilities cost functions support the view of poor quality in these facilities. The availability of drugs is a commonly used proxy for quality of health services, albeit, an unsatisfactory one (Wouters, 1993). The literature on user fees shows that drug availability is critical to quality perceptions of consumers and that the imposition of fees in public facilities is acceptable if these fees are used to improve quality, the latter meaning more drugs made available (Litvack and Boddart, 1994; Mwabu and Mwangi, 1989).

Estimates of the cost shares of personnel showed that the highest difference

Table 5.13
Translog Estimates of Average Variable Cost Function
Evaluated at Means of All Values

Translog Cost Estimates of:
Economies of Scale 1
Economies of Scope /a -.20282

Predicted Variable	Primary	Secondary	Tertiary Non-Teaching	Tertiary Teaching	Public	Private
Cost Share of Medical Residents	0.1033	0.1262	0.1421	0.0851	0.1441	0.1154
Cost Share of Nurses	0.1377	0.1406	0.1558	0.1422	0.1556	0.136
Cost Share of Other Medical Personnel	0.1605	0.1402	0.0885	0.0725	0.1114	0.1127
Cost Share of Non-Medical Personnel	0.1797	0.1645	0.1062	0.1090	0.1408	0.1346
Cost Share of Drugs	0.4402	0.4372	0.4979	0.5584	0.4591	0.4910
Output Elasticity of Variable Costs (IP)	-0.0906	0.0946	0.1832	0.1955	0.0371	0.1420
Output Elasticity of Variable Costs (OP)	0.5026	0.4453	0.5408	0.5589	0.5308	0.4988
Capital Elasticity of Variable Cost (Beds)	0.3728	0.4572	0.5311	0.4657	0.5104	0.4508
Index of Ray Scale Economies (Min.)	2.5626	2.1535	1.9217	0.9235	7.3955	3.0411
Index of Ray Scale Economies (Mean)	1.5225	1.0053	0.6477	0.7082	0.8621	0.8571
Index of Ray Scale Economies (Max.)	1.5266	0.8533	0.1530	0.6111	-0.9580	0.3998
Index of Scope Economies	-0.2768	-0.0247	0.0155	0.0361	-0.0315	0.0149

a/ Wald Test shown not significantly different from zero.
Source Alba and Bugayong (1994), Table 4

between public and private hospitals was reported for the cost share of medical residents. The cost shares of higher level personnel was higher in non-teaching tertiary facilities. Cost shares of nurses were much higher in public than in private hospitals, and formed the next biggest cost item in tertiary facilities. The high cost share of nurses in higher level facilities may reflect the standard licensing regulations which specify the number of staff for every service level offered. Although one cannot prejudge the appropriate factor mix as they vary across countries and hospitals, staffing patterns can serve as an indicator of hospital performance (Barnum and Kutzin, 1993). Low-level staffing, as shown by high cost share of non-medical personnel, was highest in primary and secondary hospitals reflecting the low level of resources used per patient. Although it is generally held that higher level facilities offer better quality services, without information health outcomes for each facility type, one cannot directly deduce the quality differences in these facilities.

Estimated elasticities of variable costs reflect the changes in variable costs arising from changes in hospital outputs and capacity (i.e. number of bed proxy). That these output elasticities were found to be low can be interpreted as the relative unresponsiveness of variable costs to small increases in outputs. But this appears to be contrary to findings by Zingapan, shown in Table 5.12, which showed hospital services to be driving total costs up. That Zingapan observed the significant relationships through a simultaneous system, with the hospital outputs estimated endogenously, may suggest that hospital services, at least for in-patient services, may be endogenous. That is, the number of in-patients is determined from within the hospital function. The Alba-Bugayong model may therefore suffer from a misspecification problem. Or the problem may be due to an omitted variable error.

Cowing and Holtman (1983) who used similar translog estimates, had a variable on 'the number of admitting physicians'. Cowing and Holtman found a significant influence of their estimates, suggesting that doctors "can over-use services or generate demand for services" (1983: 646).

In terms of the cost curves, the authors concluded that hospitals were operating at the decreasing portion of their average variable costs curves. A doubling of in-patient discharges would increase variable costs by only 3.7 percent in public facilities and 14.0 percent in private facilities. While a doubling of out-patient visits would lead to a 53.1 and 49.8 percent increase in variable costs of public and private hospitals, respectively. Tertiary teaching facilities were more responsive than other facility-types.

An increase in hospital capacity by doubling the number of beds increased costs by 51 and 45 percent for public and private hospitals, respectively. The low responsiveness on variable costs of capacity expansion in primary-level facilities could explain the growth of private primary facilities. Alba and Bugayong noted that the positive relationship between capital intensity and variable costs may not be an important concern compared to the greater issue of whether improvements in technology result in enhanced capacity to prevent deaths and improve treatment. Without a variable to capture case mix in their model, the answer is precluded. The exclusion of a case mix variable was shown by Feldstein (1984) to result in underestimates of returns to scale.

Index of scale economies could capture whether doubling of outputs influence costs. Increases in the number of beds in primary facilities, even given their maximum capacities, appear to be warranted. A smaller scale for tertiary non-teaching facilities appears to be more efficient. Economies of scale of public facilities

were near to one, signifying nearly constant returns to scale; i.e. costs did not vary with upward or downward scaling of all inputs. Private facilities enjoyed economies at lower capacity levels, with the economies declining as capacity was expanded. Economies of scale estimated by the authors for the whole sample showed that hospital operations exhibited constant returns to scale; suggesting that small operations were just as efficient as large hospital set-ups. Caution is advised, however, in interpreting the results since long-run behaviour was inferred from short-run data and fixed cost was proxied by beds and no other fixed investments.

Estimates for the whole sample showed that index of economies of scope were insignificantly different from zero. Offering out-patient and in-patient services jointly were not any cheaper than offering these services singly. Economies of scope simulations suggest that combining out-patient and in-patient services yield diseconomies for primary and secondary facilities, and for public facilities. Combining these services bring about slight increases in expenditures in private and tertiary facilities. Again caution must be made in drawing conclusions from these results for reasons closely related to case mix. Broad aggregation of hospital output into out-patient and in-patient services fails to capture the multi-product scope of hospital activities,i.e. emergency room care, maternity care, etc.

5.4.4 Comparison of Philippine Cost Function Estimates with Other Countries' Estimates

The two studies cited showed that hospital costs in the country were largely driven by inputs and hospital services, although in varying degrees between public and private facilities. Marginal cost estimates showed that private facilities were more cost-efficient providers for in-patient services. No direct conclusion could be made for out-patient services because of differences in organization which has not been captured

because of measurement error. Private hospital sector costs appeared to be sensitive to increases in wages and beds, the two areas where substantial non-price competition is expected to take place (Robinson, 1988).

Barnum and Kutzin (1993) summarized a set of cost studies involving four developing countries and observed constant or mildly diminishing returns to scale, especially for large hospitals. An observation noted to be true for industrial economies as well. Alba and Bugayong (1994) showed that, for the Philippines, diseconomies (index less than 1) were generally observed for simulations on tertiary teaching facilities, which are generally large facilities. The pattern in scope economies in China and Colombia, as examined by Barnum and Kutzin (1993), was also mirrored in the Philippines. Positive scope economies experienced by private and tertiary facilities were so slight that the combination of outpatient and inpatient services appeared to be inefficient, as they were for smaller and public facilities. This observation appears to find support from evidence in the U.S. as cited by Barnum and Kutzin. Wouters (1993), on the other hand, observed constant returns to scale for out-patient services and increasing returns to scale for in-patient care in Kenya. No scope economies between out-patient and in-patient services were observed.

The weak scope economies prevailing for public and private facilities, and in larger or smaller facilities argues for further investigation, one which perhaps disaggregates primary level facilities between public and private as well as between types of control of public facilities, i.e. national or local government. This would require larger samples than the present database can accommodate. Highly aggregated data leads to over estimation of the hospital capacity (Joskow, 1973). Cost behaviour was likely to change with time and the economic relationship embodied in these

estimates will have to be revisited. For example, changes in the management structure, in terms of a wider ownership base like a corporate set-up or public listing may alter the scale and scope of operations as additional capital entails expansion.

5.4.5 Limits of Hospital Cost Function Estimates in the Philippines

The studies of Zingapan (1994) and Alba and Bugayong (1994) presented in this chapter comprise the initial hospital cost function studies in the Philippines. It represents both the traditional (Cobb-Douglas functions) and advanced (translog flexible functional forms) methodological approaches to cost function analysis. The complexity with which these estimates have been made masked methodological and measurement issues cited above. But the underlying production function or the technological relationship transforming inputs into outputs remains unknown. Since these cost functions assume that cost-minimization behaviour is given as a restriction, such behaviour is no longer the interest of empirical investigations. Market structure analysis in the next chapter is useful in this context. Using the same work by Zingapan, one can gain information from the behaviour of prices and the extent of competition and/or contestability. Whether this cost-minimization assumption is validated can be gleaned from market structure analysis.

The paucity or problems with the data reflect the early stage of the studies. Without the adequate capture of case mix and quality, cost function estimates, however, need to be interpreted with caution. The extent to which the evidence may guide policy was limited by insufficient variables to capture quality and the complex nature of hospital activities. Given the nature of discharges in Philippine hospitals which were dominated by communicable, infectious and maternity cases, case mix in term of

outputs of obstetric or diagnostic laboratory units could be investigated. Further aggregation would allow comparisons to be made between non-hospital and hospital care for certain of these health conditions and service departments.

Quality, measured by equipment, was also inadequate due to the lumping of sophisticated MRI/CT scan equipment with basic X-ray machines. Personnel ratios can inform on quality; although they may not necessarily coincide with patient valuations (Phelps, 1992). Composite measures of quality, as suggested in Wouters (1993) and similar to the quality measure developed for the health care demand model in Chapter 4; along with diagnostic-related group analysis of hospital treatment episodes (Soderlund, et al., 1995) can be explored for further work in hospital cost studies.

5.5 Conclusions

The supply-side of the health sector in the Philippines showed a mixed pattern of capacities and dispersion. While public hospital facilities were largely (52 percent) medium-sized facilities, with beds between 25 and 99, private facilities, on the other hand, were dominated (57 percent) by small, primary facilities. While private facilities comprised a larger share (66 percent) of the total number of hospitals, public beds exceed the private, at 55 and 45 percent, respectively. In terms of distribution across the regions, the National Capital Region had a larger share of beds in both public and private facilities. But the dispersion of primary private facilities show a curious pattern, with nearly half (49 percent) of primary beds found in the regions down the southern portion of the country. This pattern has raised concerns that this may be attributed to the reimbursement system of Medicare as higher reimbursement claims were also uncovered in these areas.

Health manpower profiles, on the other hand, showed that the population to nurses and midwives ratios were favourable compared to physicians. The population was generally underserved by dentists. The geographic distribution of the health manpower showed that more physicians were found operating outside Metro Manila and its environs, than were dentists or nurses.

The profile of assets and technology in hospital facilities reflected that public facilities have considerably more assets than private facilities. Details from the hospital survey, however, showed that investments in vital medical equipment varied by size of facilities, with private investments in this equipment exceeding public investment. But the lack of full complement of vital equipment like X-ray and ECG in secondary facilities raises questions about the quality of these facilities. More private tertiary facilities reported having the relatively costly MRI/CT scan, than private secondary facilities reported having an ultrasound.

The profile of out-patient provider practice showed that there appeared to be a mutually self-supporting pattern between private practitioners and hospitals whereby the latter provide facilities for independent practice by physicians. This landlord role for hospitals made out-patient practice in the private sector relatively independent, albeit restrictive to those who can afford the initial practice rights and to those with personal connections. Hence, hospital-based practices were relatively more expensive, seeing less patients and catering more to the upper income groups. Although price discrimination in terms of the economic status of the patient was more widely reported by out-patient provider.

The picture for the usual hospital in the Philippine is a for-profit, single proprietorship or family corporation. With clearly defined property rights, the

question is now whether behaviour in these firms are consistent with profit or cost-minimizing behaviour.

The examination of the cost structure of hospitals suggested that hospital services and input costs determined the total costs of hospitals. The lack of significance of other variables, especially those representing case mix and quality, demonstrated the specification and measurement problems in estimating hospital cost functions. The difficulty was further highlighted by economies of scale and scope estimates to determine efficiency of hospital production. The reported estimates suggested that costs changed in the same proportion as outputs. Having less or more outputs, or having small or large operations, did not influence the structure of hospital costs. Economies of scope estimates reported here also showed no cost advantage for combining in-patient with out-patient services.

These issues highlight the complexity of hospital operations that pose a methodological challenge. Yet, the sophistication with which most of these models were estimated suggests that the picture thus presented can sufficiently guide policy. One difficulty is that these hospital models were framed in a static manner and therefore ignore the dynamic changes in outputs given the rapid changes in inputs, especially technology. The extent to which health care supply-side behaviour is sensitive to elements in the market structure, i.e. pricing behaviour, competition or concentration, is made in the next chapter to determine the efficiency or cost-minimizing features of the health care market. A more complete picture, which combines supply-side considerations with the demand side, provides a coherent picture of the health care market in the context of market structure analysis.

Chapter Six

The Structure of the Health Services Market in the Philippines

Introduction

Earlier chapters on demand and supply have identified the degree to which demand and supply-side behaviour responds to incentives in the market. What remains to be done in this chapter is to identify the structure of the market in which such behaviour is manifest. Critical to understanding market structure is the knowledge of the market shares of firms, the role of competition and the nature of pricing. Knowledge of these elements provides an opportunity to examine the tenets of industrial economics, particularly contestability analysis, for the insights it may shed on health care market structures.

The chapter is divided up as follows. The first part presents an overview of market structure analysis, emphasizing the tenets of the theory of perfectly contestable markets (PCM). The second part presents the methodology used to analyze the structure of the market. The third part presents the empirical results. The fourth part examines whether the market structure identified can be described as a contestable market.

6.1 An Overview of Market Structure Analysis

6.1.1 Market Structure Perspectives and Contestability Analysis

The standard approach to the analysis of the market or industry structure is examines the size distribution of firms in an industry or across the market. The critical element of the analysis is the number of firms. The empirical task is directed at establishing the market shares of firms and examining for the degree of concentration

or competition. A single measure or index is derived to embody this distribution of firms and this is used as an exogenous variable to examine the influence of structure on firm behaviour and market performance. Differences in performance measures like pricing, efficiency, innovation and profits are evaluated against a set of factors which include the index of market structure, external and internal conditions (Shepherd, 1990).

Expressed in a functional relationship, the study of market structure is modelled, in the mainstream approach as (Ibid., p.7):

> Performance = a function of (Structure, Behaviour, Internal Organization, and External Conditions)

Mainstream industrial organization is viewed to be "primarily about internal market conditions; i.e. the degrees of actual competition and monopoly among firms already in the market" (Shepherd, 1984; p.574).

The theory on perfectly contestable markets (PCM), on the other hand, considers potential entry as a more decisive element of market structure and not market shares, nor the market's internal structure nor the number of firms. The external conditions of potential entry are considered to influence internal market performance. It does not matter whether there is only one firm or a few firms as the threat posed by potential rivals will make them perform in an optimal way, akin to behaviour under competitive conditions. Potential entry is the main determining element to both structure and performance.

Under PCM, the structure of industry is endogenous[1]. In contrasting the new theory with the mainstream approach, Baumol (1982) describes the difference as:

> ...*In the older theory*, the nature of the industry structure was *not* normally explained by the analysis. It was, in effect, taken to be given exogenously, with the fates determining, apparently capriciously, that one industry will be organized as an oligopoly, another as a monopoly and a third as a set of monopolistic competitors...The new analyses are radically different in this respect. In our analysis, among others, an industry's structure is determined explicitly, endogenously, and simultaneously with the pricing, output, advertising and other decisions of the firms of which it is constituted. This, perhaps, is one of the prime contributions of the new theoretical analyses (p.3).

6.1.2 The Basic Tenets of Contestability Analysis

A perfectly contestable market is "one into which entry is absolutely free, and *exit is absolutely costless*" (Ibid., p.3). The crucial assumption that provides a standard for market behaviour is that of hit-and-run entry and exit which arises because of the absence of sunk costs. The ability of the entrant to assess the profitability of entry is unrestricted since this entrant is placed in a symmetrical position to the incumbent in terms of production technique, regulatory conditions and product quality. There is no cost disadvantage, therefore, to a potential entrant. The potential entrant can also expect no immediate price response from the incumbent. Since entry is free, an incumbent cannot prevent an entrant from entering by responding immediately in terms of price adjustments. Accommodating retaliatory response from incumbents would not fulfil the condition of 'frictionless' or 'free entry'. But in any case it may be possible for potential entrants to enter into long-term contracts with customers before entry, protecting it from any incumbent price response (Baumol, Panzar and Willig,

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[1]This claim has not been accepted by some authors. Shepherd (1984, p. 578) states that this claim suggests an "unfamiliarity with the literature...Extensive research has sought to show how scale economies do influence structure; in short, to make structure endogenous to a full analysis." Martin (1993) cites a large empirical literature that endogenizes market structure.

henceforth BPW, 1988).

The price of the products sold by incumbents serves as the yardstick by which a potential entrant can assess profit opportunities. With prices serving as relatively fixed parameters, if these prices present opportunities for profits, then entry will be induced until such a point that competitive pricing, i.e. where P = MC and zero economic profits prevail. A necessary condition for equilibrium in a PCM is sustainability. A sustainable structure is defined as a configuration which (BPW, 1986; p. 341-342):

> ...affords no profitable opportunities for entry by potential entrants who regard incumbents' prices as fixed (for a period sufficiently long to make C (...) the relevant flow-cost function for an entrant). *Equation omitted*

Sustainability as an attribute of contestable markets implies that prices are such that there are no excess profits in the industry to invite entry into the market. That economic profits be zero applies even if the market is oligopolistic or monopolistic. To wit (Ibid., p.4):

> In sum, in a perfectly contestable market any economic profit earned by an incumbent automatically constitutes an earnings opportunity for an entrant who will hit and, if necessary, run (counting his temporary but supernormal profits on the way to the bank). Consequently, in contestable markets, zero profits must characterize any equilibrium, even under monopoly or oligopoly.

The strength of the potential entrant in determining market outcomes lies in the premise that entry involves zero or low sunk costs, i.e. investments are recoverable, or reversible upon exit. Therefore, in the absence of concerns on the magnitude of investments, discussions on collusion or other strategic behaviour are assumed away. In the words of the originators (BPW et al., 1986):

> ...no role is played by the sunk costs, precommitments, asymmetric information and strategic behaviour that characterise many real markets and that are the subject of much penetrating current research in industrial organisation. With irreversibilities and inducements for strategic behaviour assumed away, industry

> structure in perfectly-contestable markets is determined by the fundamental forces of demand and of production technology (p.339).

Demand is considered only in so far as it defines the size of the market, i.e. that level of demand where prices are at the neighbourhood of average costs (Spence, 1983; p.988). This presents a theoretical advantage to the theory of PCM. To quote Baumol and Lee (1991):

> ... contestability facilitates the construction and analysis of economic models in many of the ways (and for the same reason) that perfect competition does. The reason is that contestable markets impose prices rather than demand curves on firms. This fact permits the analytic simplification of dealing in parametric prices without injection of the complications that arise in taking demand functions into account in an analysis of the behavior of the firm (p.3-4).

As to production technology, economies of scale or capital intensive methods, do not necessarily correlate with sunk costs. This facilitates the generalizability of the theory of PCM to market configurations where increasing, decreasing or constant returns to scale may be the norm. In addition, sunk costs are shown not to correlate with fixed costs (BPW, 1982; p.288). This does away with a significant entry barrier, fixed costs, considered in mainstream industrial organization analysis.

Aside from precluding excessive profits, PCMs are also characterized by the following attributes which highlight its welfare properties (Baumol and Lee, 1991, p.3): 1) absence of any sort of inefficiency, e.g. technical, allocative or X-inefficiency, in production at industry equilibrium; 2) in cases where the market contains two or more sellers, a contestable market requires that the price at which a product is sold is equal to marginal cost as required in first-best Pareto optimality; and 3) absence of cross-subsidy or predatory pricing. The first two are straightforward. Inefficiencies increase costs and constitute an invitation for entry by an entrant who can minimize on these costs. Pricing below or above marginal costs, where there is more than one

seller, presents opportunities for undercutting the incumbent in prices (by producing one more or less unit) and in profits which further serve as opportunities for hit-and-run entry.

Predatory pricing sees the incumbent firm adopting a price entailing a deliberate sacrifice of profits, to either drive out a rival or prevent entry, for the much bigger reward of profits once the objective has been attained. With excessive profits precluded by zero costs of entry, predatory pricing becomes unattractive. Cross-subsidy on the other hand entails that low prices in one product line are offset by higher prices in another product line of the same firm. To quote Baumol and Lee (Ibid.):

> ...cross-subsidy permits the entrant to profit by stealing the incumbent's profitable markets away, sharing with customers of those products part of the supplier's earnings previously going into the cross subsidy (p. 6).

These welfare outcomes, therefore, present contestable markets as attractive, with the results attainable by the mere threat of potential entry. These results hold regardless of whether the industry structure is a natural monopoly, a perfectly competitive industry or oligopoly behaving competitively. For, as developed more formally in BPW (1982; 1988), equilibrium is sustainable in these structures. Monopoly and oligopoly do not necessarily result in welfare losses. Once it is established that a market is contestable, the invisible hand can hold sway, extending the merits of perfect competition beyond its usual boundaries (BPW, 1986; p.333).

Where unsustainability may be the norm, decision-making guided by the price system will be infeasible. The structures that may apply, pertain to cases of partial monopolies and/ or monopolistic competition, characterized as Chamberlinian structures. Partial monopolies allow the cross-subsidy pricing (cited in the immediate

quotation above) and are, therefore, unsustainable. In monopolistic situations, where prices are set on the basis of anticipated price reactions of rivals, and therefore result in higher tangency equilibria and prices, profitable entry opportunities are presented. This, therefore, does not represent equilibria in contestable markets.

Failure to establish contestability does not lessen the power of the theory. As Baumol and Lee (1991, p. 7) stated:

> Note, however, that the analytical power of the theory does not depend on the ubiquity of contestability; indeed, its policy lessons apply primarily to industries that are not contestable, whose regulation can be aided by contestability theory, which provides norms of behavior to which the regulated firms can reasonably be held.

By accommodating configurations other than just perfectly competitive markets, the theory of PCM provides a wider scope for policy. Its broadening of the policy options for the more complex and realistic structures underpins the theory's achievement. The study of contestable markets is, therefore, a search for the 'disciplining element', if established, in market allocations.

In summary, the conditions establishing the presence of contestability involve: a) zero or low sunk costs; b) symmetric position between incumbent and potential entrant; and c) no immediate price response from the incumbent. Frictionless entry will yield optimal outcomes that are predicted as follows: a) efficient prices assuring firms of financial viability; b) equilibrium yields least-cost minimizing behaviour; and c) sustainability with firms making zero economic profits; i.e. there is no other investment that presents positive profit opportunities.

The extent to which the health care market in the Philippines can be assessed in terms of such conditions is made following the presentation of the empirical estimates.

6.2. Methodological Issues and Approach Used

This section describes the approach used by contestability analyses to identify the market structure. The second part discusses issues related to defining market boundaries in health care. The over-all approach used in the empirical portion of the chapter ends this section.

6.2.1 Determining Market Structure Using Contestability Analysis

Shepherd (1984) noted that "Baumol et al offer virtually no tests and no concrete design"(p.582). However, the determination of structure, as discussed in Baumol (1982), proceeds in two steps. The first step involves determining what structure can produce a given output vector of a given industry efficiently or in a least costly manner. In what is viewed as a normative step, if efficiency entails that the industry output vector is small compared to cost-minimization output levels of the most efficient firm, then the structure will be characterized by few firms. The second step involves investigating when market pressures will lead towards such efficient equilibrium structure. The transition to the second step is described by Baumol (Ibid.) as follows:

> The transition toward the second, behavioral, stage of analysis is provided by the observation that the optimal structure of an industry depends on its output vector, while that output vector in turn depends on prices charged by its firms. But since pricing depends on industry structure, then we are brought full circle to the conclusion that pricing behaviour and industry structure must be determined simultaneously and endogenously (p.7).

Given an endogenous format for determining structure, the output vector which minimizes total costs at equilibrium must, therefore, be the only structure consistent with industry equilibrium in the long run. For Baumol (Ibid.), this makes

> ...the second stage of the analysis of industry (turns out to be) a sham. Whatever industry structure was shown by the first normative portion of the analysis to be least costly must also emerge as the industry structure selected

> by market behaviour...No additional calculations are required by the behavioural analysis. It will have been done in the normative cost minimization analysis and the behavioural analysis is pure bonus (p.7).

An examination of prices in health services in the Philippines can, therefore, be expected to inform on the structure of the industry, following contestability theory's endogenous format described above. High price-cost margins provide an indirect test of the nature of sunk costs; i.e. "high sunk costs limit exit and entry, permitting high price-cost margins" (Shepherd, 1984; p. 583).

6.2.2 Defining Market Boundaries in Health Care

Market structure analysis begins with a definition of the market boundaries. There are two dimensions to defining these boundaries: the delineation of the product type and identification of the geographic area or location. Health services in general, and hospital services, in particular are complex organizations. Anti-trust literature, however, has shown that market boundaries can be delineated in the hospital sector. The nuances and difficulties in defining hospital markets have been reviewed extensively in Morrisey, et al.(1988) and Zwanziger et al.(1994). The former article explores the ways anti-trust guidelines in the United States can apply to the hospital market. The latter article, on the other hand, proposes a method to refine anti-trust approaches to facilitate selective contracting of providers by HMOs.

The criterion for determining the boundaries of the product market, substitutability of demand or supply, can be used to determine the nature of sunk costs in health care. Two services are considered substitutable in demand on the basis of the cross-elasticity of demand between them: the extent to which consumers are able to switch to substitutes for that good or service in response to a price increase. The results reported in the Chapter 5 show that the demand for out-patient care in

government hospitals and clinics and private providers are considered close substitutes. The extent to which this is so for hospital services does not appear as straightforward.

Zwanziger et al.(1994) has shown that substitutability from a demand perspective is akin to asking whether individual services in hospitals are substitutable in treatment. That this concept is of limited application to hospital services can be described through an example. Normal delivery and abortion, if viewed from patients, are different products. Surgery and chemotherapy may be substitutable for particular treatments but requiring different personnel and equipment; but they can be considered as the same product in the market for cancer treatment (Ibid., p.431).

Substitutability in supply would be a concept closer to the concern in contestability analysis as it refers to the extent to which providers can enter the market or expand output. Baumol, et al's analysis follows the assumption of competition models in which products from different suppliers may be viewed as homogenous. From the supply perspective, the focus is on the degree to which treatments can be performed with the same inputs of personnel and equipment and the degree to which such inputs can be shifted from one service to another. Using this criterion, Zwanziger et al. notes the following (Ibid., p. 437):

> Many hospital services do not require highly specialized equipment and/or training. In some cases a hospital need only have a physician on its staff in the appropriate specialty, a modest amount of equipment required by the specialty, and properly trained support staff to be capable of providing the service. Given these resources and the attendant equipment and training, entry into most disease-specific markets would be low-cost (Baumol, 1982). Such ease of entry suggests that a hospital that is currently the "monopoly" provider of narrowly defined service could not, based on supply substitutability, hold this monopoly long if the prices it charged were excessive, as long as the other local hospitals have the appropriately trained physicians on their staff and the necessary equipment.

Given the information provided earlier on the nature of hospital discharges

reported across size categories of hospitals (see Chapter 2, Table 2.14,), the leading causes of discharges are similar and largely relate to infectious/ communicable diseases and deliveries. Deliveries, for example, comprise 40% of tertiary hospital cases but could be done in lower level facilities or even at home. These health conditions would not require high-technology equipment and highly specialized personnel. In this sense, there is potentially easy entry into hospital services.

The geographic area or location is another dimension to delimiting market boundaries. It is important for estimating market shares and the extent of competition in a market. Two empirical studies on hospital competition estimated the geographic boundaries using zip code areas. Melnick and Zwanziger (1988) combined both political boundary and shipment-based approaches. This procedure was also applied by Robinson, et al. (1991) to a regional data in the U.K. A patient's origin data from a central information source (Health Facilities Commission for the California study and NHS data for the U.K. study) captured the extent of "export" or "import". A market area for a hospital may be considered so if it contain at least 40 percent of the hospital's discharges. A competitor was considered if at least 3 percent of its discharges were drawn from at least one of the zip code areas' (ZCAs) served by another hospital.

The estimates of market structure of hospital services in the Philippines reported in this chapter are based on household survey responses to hospital use (defined as in-patient care for more than 8 hours). Hence it captures where patients go to. There was no data available on where patients came from based on hospital admissions. The political boundary used is the province. Such boundary is expected to overstate the degree of competition for anti-trust purposes (Zwanziger, et al., 1994, p.432).

However, patient preferences and the degree to which choice is limited to certain localities are issues in themselves.

6.2.3 Over-all Approach

The empirical investigations, in this chapter, used various data sources and methodologies, to establish the market structure of health care in the Philippines. Estimates of market shares of hospital facilities, using data from the household survey used in the demand analysis, were made using an adaptation of the Hirschman-Herfindahl Index. The second part, of this section, presents regression estimates on hospital outputs from the same Zingapan (1994) study cited in Chapter 5. The emphasis of the discussion is on the nature of the market, and whether hospital outputs are influenced by price and/or the number of firms in the market. Contestability analysis posits that the determination of price, outputs and market structure is simultaneously and endogenously determined (see quote, p. 223 above, from Baumol, 1982); and therefore, no a priori assumption is made on the direction of causality. This implies that output levels and prices can indicate what the market structure is, and vice versa. The regressions on hospital outputs also serve as parts of a simultaneous system of equations to provide price and cost estimates to infer, given the limitations of the model and the data, the market structure in health care. The regressions on outputs, rather than prices, were largely dictated by data limitations.

The last portion of the empirical work examines pricing behaviour. The extent of price discrimination is examined for Metro Manila physicians' charges for in-patient consultations, using market research data. Hospital pricing behaviour, using the results of Zingapan's multi-equation regressions, is presented. Information on pricing behaviour, culled from various studies on other sectors in the health care market, is

also presented to identify the structure of the health care market.

6.3 Empirical Analysis

6.3.1 The Extent of Competition / Concentration in the Hospital Market in the Philippines

After identifying the market boundaries, market structure is estimated using an adaptation of a widely-used index, the Hirschman-Herfindahl Index (HHI). The index is estimated by summing-up the squares of the market shares of all firms, in this case, hospitals, in the area. HHI figures fall between 0 and 1, with 1 signifying extreme concentration. Because of the household sample base, the measure shown below is a modification of HHI since only the market shares of the top-three hospitals which most households reportedly used were included. What the measure of concentration has captured is the extent to which a particular hospital faces competition, from the perspective of patient choice. Weighing the index by the proportion of total users for each category over the number of reporting households in the area gives a measure of the degree of competition.

The results are shown in Table 6.1. Hospital markets in the Philippines are shown to be competitive, to the extent that there are, from the patient's perspective, many firms to choose from. The highest index of concentration was .36 for the most far-flung province in the sample. The concentration index for public hospitals appears to be slightly higher than for the private hospital market, suggesting that public hospitals may have a large share of the market in areas where private investment may be lacking. Weighing the index to control for public-private preferences, showed that the top three hospitals hardly constituted a significant presence as the index was hardly nudged, e.g. rounding-off to the nearest point would yield closely similar amounts.

Table 6.1
Market Concentration of Top Three * Hospitals
By Type of Hospital, in Survey Areas
1992

Areas/ Name of Hospitals	Share of Top Three	Market Share	Concentration Index**	Degree of Competition***	No. of Hospital	Total Authorize Bed Capacity
Metro Manila/Public	35%	49%	0.01	0.005	39	18[illegible]2
Metro Manila Private	26%	51%	0.00	0.002	116	8682
Region 2						
Cagayan/Public	82%	77%	0.12	0.096	14	748
Cagayan/Private	80%	23%	0.01	0.003	16	240
Quirino/Public	100%	80%	0.26	0.208	4	160
Quirino Private	100%	20%	0.04	0.008	0	0
Region 7						
Cebu/Public	63%	45%	0.03	0.015	21	2045
Cebu/Private	56%	55%	0.03	0.018	25	1718
Bohol/Public	65%	65%	0.06	0.04	11	492
Bohol/Private	78%	35%	0.03	0.009	20	609
Region 10						
Misamis Oriental/Public	68%	54%	0.10	0.055	10	580
Misamis Oriental/Private	82%	46%	0.04	0.016	13	426
Surigao/Public	82%	89%	0.36	0.322	9	445
Surigao/Private	100%	11%	0.01	0.001	3	60

* the top three hospitals reported used in a household survey
** the closer to 1 the more concentrated; closer to 0 less concentrated;
estimated as sum of the square of individuals shares of hospitals in top 3
*** concentration index * market share (following Melnick and Zwanziger, 1988)

Source of Data: first four columns: DOH-PIDS Household Survey
Other Hospital Information: DOH-PIDS Hospital Survey

This signifies that consumers are faced with a range of choices.

The method is not perfect. Estimates, using more centralised data bases, such as that using a sample of hospitals in the West Midlands in the U.K., showed three-quarters of hospital samples operating in a competitive environment (Robinson, et al., 1991). That the analysis might overstate the degree of competition is attributed by the authors to the high level of aggregation in the use of the district as the unit of analysis; and to the service unit analyzed -- general surgery. The use of provincial boundaries, in this Philippine patient hospital choice samples, may have broadened the market unrealistically if one considers that hospitals may consider as their competitors only those within their immediate vicinity. On the other hand, using the province as the geographic unit may still be too small an area as some households can cross seas to get to the best metropolitan hospitals. In Quirino, for example, there appeared to be no private hospitals at the time of the survey, but there had been private hospital use. Presumably the named hospitals are located in the nearest capital in the region. For Surigao, while there are three private hospitals, the named hospital for the majority of users is a private hospital in Cebu. Without data at a more disaggregated level, like districts and/or service categories in terms of primary, secondary or tertiary, which can capture localized preferences and probably narrow the extent of the market, the table must be interpreted with caution. In addition, patient choices did not specify hospitals chosen by type, complaint or the nature of services used. Hence, the overstatement of the degree of competition.

However, the pattern of ownership and distribution of hospital facilities does indicate that the small size of most private facilities results in the facilities being more widely dispersed, as the table suggests. Hospital planning information shows that 86

percent of the population are within 17.5 kilometres (10.85 miles) of DOH hospitals in 1989. In municipality terms, 80 percent of municipalities are within that access boundary to public hospitals. Primary hospitals are allowed licenses within 15 km. radius of one another (9.4 miles) in urban areas. The private and relatively low-cost nature of hospital investments would support a more dispersed distribution. Information about choices of location by physicians in the United States, for example, showed that locating in a small town was economically justifiable, depending on one's specialization (Newhouse, et al., 1982). The diffusion of specialists followed the population distribution pattern. Where specialists were scarce, there would be convergence on large, urban centres. However, primary care specialists (i.e. internal medicine, obstetrician-gynaecologists, etc.) tended to have wider market areas and were likely be found in small towns. Hospitals, especially primary hospitals, are likely to be set-up, not by general practitioners, but, by more multi-product primary care specialists which allows for greater substitutability in supply, serving wider markets.

What the measure of concentration in this section has captured is the extent to which a particular hospital faces competition in the eyes of the patient. Whether the number of firms or local competition influence hospital outputs is now examined.

6.3.2 Role of Competition in Hospital Services

Whether the presence of other facilities affect hospital behaviour can be gleaned from the regressions made by Zingapan (1994) on hospital output measures, i.e. in-patient discharges and out-patient contacts. While Zingapan interpreted these estimates as demand for hospital services, that were used to estimate the price estimates shown later, these dependent variables can also be interpreted as output or performance measures for hospitals. This interpretation allows the examination of market structure

issues, i.e. role of competition or prices in determining output.

The results, reproduced in Tables 6.2 and 6.3, show the determinants of hospital performance, for in-patient and out-patient services respectively. The functional relationships are shown as follows (Zingapan, 1994, p.26):

hospital in-patient discharges model:

(1) $ln\ D = d_0 + d_1P_d + d_2lnI + d_3OB + d_4B + d_5lnF + d_6lnM + d_7Pk + d_8E + d_9X + v;$

hospital out-patient contacts model:

(2) $ln\ O = o_0 + o_1P_k + o_2lnI + o_3OP + o_4B + o_5lnF + o_6Pd + o_7E + o_8X + e;$

where:

P_d : average fee per discharge

P_k : average fee per out-patient contact or visit

I : total number of persons in the province with health complaint

OB : total bed capacity of other hospitals in the municipality

OP : average hospital out-patient fee in the province

F : average fee charged by physicians per hospital in-patient episode in the municipality

M : average support value per insured patient of the hospital

X : average annual household expenditures per province

V, e : error terms

The descriptive statistics are provided in Appendix 6. The model explains the behaviour of in-patient services in government facilities better than the behaviour of private facilities, at 86 and 68 percent respectively, and to a much lower extent for out-patient services. The out-patient model captured private hospitals' performance weakly,

Table 6.2
Measure of Hospital Performance 1: Total Discharge

Dependent Variable: Ln(Total Discharges)		
Independent Variables	Government	Private
Constant	8.2696 (7.27)*	7.0656 (2.04)
Fee Per Discharge	0.0032 (4.11)*	-0.0003 (-2.58)*
Ln (Illness incidence in Province)	0.2004 (2.68)*	-0.1454 (-0.41)
Bed Capacity of other Hospitals in the Municipality	-0.0002 (-3.50)*	-0.0001 (-1.24)
Total number of Hospital Beds	0.0126 (6.12)*	0.0213 (4.70)*
Ln (Doctors' average fee)	0.3999 (-2.38)*	0.0478 (.0844)
Ln(Support value per insured patien	-0.3344 (-4.91)*	0.3591 (3.00)*
Fee Per outpatient Visit	0.0095 (1.12)	-0.0143 (-2.79)*
Equipment	0.3188 (1.36)	0.8914 (1.40)
Ave. Household Expenditures	-7.7623E-08 (-.89)	5.7071E-08 (.30)
R-squared	0.8550	0.6822
Number of Observations	33	32

* Significant at .05 level

Source: Zingapan (1994), p. 42

Table 6.3
Measure of Hospital Performance 2: Outpatient Visits

Dependent Variable: Ln (Outpatient Visit)		
Independent Variables	Government	Private
Constant	2.7782	10.0709
	(1.3)	(5.89)*
Fee Per Discharge	0.0016	-1.4641E-05
	(2.11)*	(-0.35)
Ln (Illness Incidence in Province	0.5007	-0.0898
	(3.24)*	(-0.49)
Ave. Outpatient Fee Per Provinc	-0.0026	-0.0898
	(-0.86)	(-1.96)
Total Number of Hospital Beds	0.0043	0.0084
	(0.92)	(2.74)*
Ln (Doctors Average Fee)	0.0441	-0.1039
	(0.12)	(-0.37)
Fee per Outpatient Visit	-0.0421	-0.0074
	(2.14)*	(-2.36)*
Equipment	0.6792	1.1573
	(1.42)	(2.43)*
Ave. Household Expenditures	4.7716E-09	1.5516E-08
	(0.03)	(0.16)
R-squared	0.7742	0.2949
Number of Observations	33	32

* Significant at .05 level

Source: Zingapan (1994), p.45

at 30 percent compared to 70 percent of public hospitals' out-patient outputs. The models comprised part of a simultaneous system which included the cost function cited above, in p. 195, and the price estimates to be shown in the next section. Therefore, the econometric problems related to the cost function estimates, in Section 5.4.2, apply to these estimates as well. As part of a simultaneous equation system, misspecification of system affects estimates of all structural parameters (Kennedy, 1992). Furthermore, the estimates may suffer from multi-collinearity, where the variables on the right hand side may be closely correlated leading to bias and inconsistent estimates. The results, therefore, must be qualified in the light of these difficulties and should at best be interpreted as providing indications of the actual patterns.

There are two concerns which are captured in these estimates: 1) the role of own-prices; and 2) the role of the number of other suppliers, or extent of competition, on hospital discharges. The role of actual competition is, therefore, examined in the context of hospital operations.

6.3.2.1 Role of Prices of Services on Hospital Performance

The extent to which hospital outputs are responsive to 'own-price' reflects on the nature of competition. The same tables 6.2 and 6.3 show that prices, or fees per discharge, are significant for both types of facilities albeit in only slight degrees, three points from the decimal. But the sign in the relationship is in the opposite direction registered for public and private facilities. The higher the fees per discharge the higher the reduction in the number of discharges for private hospitals; while the number of discharges from government facilities increased with higher charges. Zingapan (1994) observed that the positive relationship between price and government

hospital discharges appear to make sense only within the context of the price-quality relationship. Higher prices may serve as proxies for quality from the patient's perspective. The extent to which this is so cannot be fully ascertained given the lack of significance of the quality variable, 'equipment' or the presence of basic (X-ray) and sophisticated (MRI/CT scan) equipment, in the government equation. But this failure to find a significant link with the 'equipment' variable may be due to the lumping together of basic equipment with a sophisticated and costly one (Zingapan, Ibid.)

The support value per insured patient, measured as hospital receipts from compulsory and private insurance divided by total number of insured patients, also showed opposing influence on the number of discharges between private and public facilities. Higher support value increased private hospital in-patients, while higher support value decreased public hospital discharges. Zingapan (Ibid.) observed that insurance coverage for diagnostic services and medicines facilitated their increased use, possibly shortening lengths of stay (LOS) in private facilities, "allowing the hospital to treat a greater number of cases"(p.43). The negative influence of insurance on government discharges, on the other hand, was attributed by the author to increased lengths of stay in public facilities not only because of the insurance coverage but also because of the lack of available drugs and shortages may induce such long stays. This interpretation, however, should be treated with caution as there is no empirical support to link LOS with insurance. A study on hospital demand, using length of stay as the dependent variable in an ordinary least-squares regression, there was no significant relationship between insurance and length of stay (Bautista, 1994). And the suggestion on over-capitalization made earlier in Section 5.4.2, does not support the implication that private facilities suffer from over-crowding, preventing them from treating more

cases, with or without insurance. An alternative interpretation would be that the institutional element introduced by the support from insurance provides further substantiation to the price-quality interaction in government facilities. In so far as a higher support value decreases the price for the patient, a negative relationship for government means that an increase in support value would drive total discharges down in government facilities as opposed to private facilities. Those with insurance are likely to prefer private facilities which are perceived to be of higher quality.

The results also show that private facilities respond to price competition. 'Own-price' variables are significant, and in the expected direction (negative), for both in-patient and out-patient outputs. With the variables, 'number of hospital beds' suggesting size and the 'equipment dummy' being positive and significant for out-patient services in private facilities, the suggestion is that size and equipment in private hospitals attract out-patients. Therefore, expansion and enhancements of hospital facilities in terms of equipment, may serve as proxies for quality and can, therefore, serve to attract more out-patient contacts for private hospitals. Zingapan (1994) interpreted the 'equipment' and 'number of beds' variable together to suggest demand inducement for out-patient contacts in private facilities. An alternative interpretation, however, is that the significance of 'own-price', 'equipment' and hospital size variables for the private out-patient outputs suggests that both price and non-price competition may be operating. With the coefficients of these non-price variables, both singly or combined, exceeding the coefficient of the 'own-price' variable, non-price competition appears to prevail over, or swamp, price competition. Noether (1992) showed similar tendencies in U.S. hospital samples and observed that the strength of each type of competition cannot be firmly established.

For cross-price effects, a higher fee for an out-patient visit is likely to lead to a decline in total discharges in private facilities; and an increase in-patient fees can lead to an increase in the number of out-patient visits in government hospitals. This suggests a potential for some cross-subsidization in the internal operations of hospital services, particularly in public services.

6.3.2.2 Actual Competition and Hospital Outputs

For in-patient services in Table 6.2, the variable 'bed capacity (number of beds) of other hospitals in the municipality' is used as an indication of the actual competition faced by the hospitals. It is significant only for government hospitals and the influence is negative. An expansion or increase of other facilities in the area would lead to a slight decrease (.0002 percent reduction for every 1 percent increase in municipality beds) in the number of public hospital discharges. If non-public facilities were available, public hospital discharges would slightly decline. Competition does not appear to be an important factor in explaining the number of private hospital discharges. Zingapan (1994) explained that this may be due to significant collinearity between the variable 'number of beds in other hospitals' with the 'discharge fee' variable.

'Actual number of beds', a measure of size and capacity of the hospital, is significant for both government and private hospitals. The greater the number of beds, the higher the number of discharges. This raises the old question about demand inducement; i.e. have a bed and it will be used. While the 'illness incidence' variable is significant and positive for government facilities, it appears to be insignificant for private facilities. An increase in 'illness incidence in the province' increases total discharges in public facilities, but is of no importance for private facilities.

Zingapan reported making alternative estimates using 'illness incidence in the municipality' instead of province provincial incidence but did not find different results. It appears that "only market factors are relevant in rationing private hospital services" (Zingapan, 1994; p.44). This suggests that private hospitals can generate demand, not related to population needs.

The variable 'doctors' average fee', defined as the average fee of physicians in the municipality where the hospital is located, weighted by the type of hospital accommodation of patients, is likely to cause a decline in public hospital admissions but would cause no significant effect on private hospitals. Zingapan (Ibid.) observed the following:

> The negative relationship supports the notion that hospitals serve as workshops of physicians, the latter being the gatekeeper or the agent who finally determines whether patients could purchase hospital services (Pauly and Redisch, 1973). Furthermore, given that government-employed physicians are not supposed to charge their patients, the regression result seems to suggest that government hospitals are in effect open-staffed facilities, i.e. these are also used as work settings of private or fee-charging physicians. On the other hand, private hospital admissions seem unresponsive to physician fee patterns but this could be due to the significant collinearity between this variable and hospital fees. If private hospitals are also owned by physicians, hospital bills could likely include professional fees (p. 41,43).

Following this argument, if government physicians can charge, they might act as 'agents' preventing admissions, for admissions are likely to increase their government work-load without any increases in renumeration. Alternatively, one can interpret this finding within the nexus of market structure analysis. The variable 'average doctors' fees' in the municipality can also serve as a market structure proxy. Textbook economics show that competition results in lower prices. The higher the prevailing doctors' fees in the municipality, the less competitive the market. A negative coefficient for this market structure proxy in government facilities suggests

that the higher the average doctors' fees (the less competitive the market), the lower the number of in-patient discharges in government facilities. A corollary of this is that the more competitive the market, as suggested by lower doctors' fees, the higher the number of discharges in government facilities. Competition, therefore, appears to promote inducement in the use of in-patient government facilities.

The out-patient model did not incorporate a variable to capture the extent to which the number of out-patient providers affect the number of out-patients' contacts in private hospitals. This may probably account for the low r-squared in the model. This would be a more difficult data to collect given the private and atomistic nature of independent physician-firms which offer out-patient services. Again we can use the variables, 'average doctors' fees' in the municipality and 'average out-patient fees in the province', as proxies for the extent of competition, with higher average fees in the municipality likely to indicate a more concentrated market. The variables are not significant for either facility-types for out-patient outputs. For Zingapan (1994), this implies "the presence of 'captive markets' for both facilities...however, price may be a poor indicator of competition" (p.45). This view is confirmed by the strength of non-price competition in out-patient contacts earlier cited (Sec. 6.3.2.1). This finding suggests that market structure, proxied by the prevailing prices in the area, does not appear to influence supply-side behaviour for hospital-based out-patient services.

6.3.3 Pricing in Hospital and Other Health Care Services

Pricing behaviour indicates market structure in general. The extent to which prices can provide insights into the type of market structure in health care in the Philippines is discussed in two ways: firstly, the extent of price discrimination ; and secondly, the extent to which prices reflect costs.

6.3.3.1 Price Discrimination

One pricing behaviour in which physician-firms and hospitals are widely known to practice is price discrimination on the basis of income. Such an approach is described by Earl (1995; p.195-196):[2]

> This sort of pricing method has often been employed by doctors in situations where people are both poor and sick and neither private insurance nor a welfare state to pay for their health care: a monopolistic medical practice in a small town would tend not to milk the local community for every cent possible but make a reasonable living by charging the rich more to cross-subsidize their treatment of the poor (p. 195-196).

Table 6.4 shows the extent of price discrimination, from private market research data (shown in Dela Paz-Kraft, 1994), by specialty, for in-patient care consultations. For in-patient care, consultation fees vary depending on the accommodation of the patients. Private accommodation ranges from double occupancy-rooms (semi-private) to suites where amenities are similar to those of better hotels. The current 1992 prices show that consulting fees increase with more expensive accommodations. Across specialties, minimum fees do not show large differences; but for maximum fees, general surgery fees are higher than the other specialties.

It is noted, however, that the case mix is not captured in the data and may therefore, bias the results. As lower income groups are likely to stay in wards, and represent more severe cases, then prices may reflect intensity of care by the physician.

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[2]The nature of price discrimination in medical care was discussed in a seminal article by Kessel (1958). The work expounds on how price discrimination by doctors, i.e. scaling of fees by income of patients, describes the behaviour of a discriminating monopolist. Yet competition among doctors, as predicted in standard economics textbooks to be in pursuit of their own interests, would tend towards the establishment of uniform prices for identical services. The failure to achieve such outcome is largely seen in terms of the control mechanisms (against price-cutting) imposed by organized medicine on its members. A critique of the work is made by Ruffin and Leigh (1973; cf. Foley, et al., 1981). Arrow (1963, p.957), however, does not believe that the scale of profit maximizing motive in price discrimination is convincing.

Table 6.4
Extent of Price Discrimation
In-Patient Consultation Fees
(1992 Pesos)

Specialization	Ward	Semi-Private	Private Room	Regular Suite
All Practitioners				
Minimum Fees	30	30	50	50
Maximum	600	800	1000	2000
Average	185	254	254	546
General Surgery				
Minimum Fees	50	100	100	100
Maximum	500	800	1000	1500
Average	198	280	411	599
Pediatrics				
Minimum Fees	100	100	150	200
Maximum	300	400	700	1000
Average	168	224	347	500
Obstetrics-Gynecology				
Minimum Fees	80	100	150	200
Maximum	250	380	750	1100
Average	157	221	315	417

Source of Basic Data:
Wyatt Survey of Physician Fees, reported in Dela Paz-Kraft (1994), Table 19

The ability to charge different buyers different prices is the essence of price discrimination. Gravelle and Rees (1992) pointed out the following:

> It is a practice which could not prevail in a competitive market because of arbitrage: those offered lower prices would resell to those offered higher prices and so a seller would not gain from discrimination. Its existence therefore suggests imperfections of competition...(p.274).

The statement needs to be qualified for health care as there is no re-sale market given that the output is often embodied in patients (Roberts, 1991). However, the ability to price discriminate in health care reflects more on the ability to segment the market through product differentiation. Kessel (1958) describes the extent of differentiation in health care as: "each buyer of medical services that are produced jointly with hospital care constitutes a unique separable market" (p.21). Differentiation refers to the distinction made between goods on the basis of the characteristics of the good, like quality, location, time, etc. This leads to the segmentation of the market on these product characteristics and the formation of 'market niches' (Tirole, 1992). The prevailing practice of price discrimination is, therefore, likely to lessen the competitive tendencies in the health care market.

6.3.3.2 Prices and the Market Structure

Prices indicate the structure of the market. The ability to charge high prices reflect the degree of market power enjoyed by firms. Table 6.5 shows pricing behaviour in hospital services in the Philippines. For hospitals, Zingapan's (1994) pricing estimates are presented. Statistical estimates of prices of in-patient care formed part of the simultaneous equation model, where prices first appeared as exogenous determinants in the cost and hospital services or demand functions (shown in p. 195 and p. 226, respectively). Prices, as instrumental variables in a simultaneous equation system, were modelled to vary with the same variables in earlier equations, along with

Table 6.5
Estimates of Market Power: Philippines

Facility /Service	Variable			Reference
Hospitals \1	Inpatient Discharges: (Pesos)	Public	Private	Zingapan, 1994
	Profit Maximizing Mark-Ups	(311)	3,448	
	Net Income Maximizing Fee	3,185	4,907	
	Fees Per Unit of Service	215	1,692	
	Marginal Costs	3,015	1,459	
	Per Unit Fees as Prop. of Marginal Cost	0.07	1.16	
	Fees as Prop. of Net Income Max'z Fee		0.34	
Insurance \2	Non-Benefit Costs as % of Contributions			Gamboa et al., 1993
	Medicare (annual ave.)	4.2		
	Private Insurance Cos.	35.46		
Drug Companies \3		Domestic	Foreign	Bautista, 1992
	Total Average Mark-up (%)	43	132	
	Break-down of Mark-Ups			
	Operating Expenses (%)	87	53	
	Profits (%)	8	29	
	Taxes (%)	4	16	
Physician-Firms \ 4	Ave. Usual Fee Over Non-Physician Costs			Kraft and Limpiado, 1994
	General Practice .95			
	Internal Medicine 1.85			
	Ob-Gyn 1.59			
	Pediatrics 1.32			
	Surgery .93			

Notes:

1/Fees, Marginal cost, profit maximizing income
estimated simultaneously using 3-stage least squares.
Source of Data: Hospital Administrators Survey, PIDS-DOH Project

2/Non-benefit costs estimated as residual
after deducting gross losses from gross premiums;
annual average from 1981-1989
Source of data: Annual Reports to the Insurance Commission

3/Mark-ups estimated as percentage increase a firm
imposes on top of what it spent for producing
its products. Based on analysis of 1983- 1986 averages from
financial statments filed with the Securities Commission by 39 drug firms.

4/Non-physician costs include expenditures for rent,
supplies, drugs, repairs, compensation of assistants,
licenses, insurance, utilities, and other overhead expenses.
Source of Data: Outpatient Clinic Survey, PIDS-DOH Project

the inclusion of subsidies per bed for government facilities, and a ratio of insurance patients to total patients to serve as identifier for consistent estimates.

Estimated in-patient prices as a proportion of marginal costs were shown to be .07 and 1.16, for public and private facilities, respectively. This indicates that fees per unit of service in the public sector did not recover the marginal cost of providing them; while, fees in the private sector more than doubly compensates (116%) for the marginal cost of provision. Profit-maximizing mark-ups estimated from econometric analysis showed high three-figure mark-ups for the private sector and negative for the public sector. Fees per patient-service, however, comprised only 34 percent of net income maximizing fees in private facilities. This implies that current fees in private facilities do not reflect what they could be if firms behaved in an income-maximizing way. If market power is not used to extract profits, as the figure suggests, then price-cost margins may reflect inefficient, non-cost minimizing behaviour.

The picture for the other components of the health sector; i.e. health insurance, drug companies, out-patient clinics, also confirmed the prevailing pattern of mark-up pricing. Although the analysis of these other components of health services are partial analysis, the picture in general for the Philippines is one where firms enjoy tremendous market power as signified by the price-cost gaps. The measures, as a result of averaging, may however, mask differing operating environments. Problems related to cost estimates, cited earlier in Sections 5.1.2 and 5.5, in Chapter 5, may under-estimate costs which may lead to overstating the price-cost gaps.

6.4 Implications for Contestability

From a perfect competition model, these prices reflect 'market power'. The ability to charge prices higher than marginal costs provides an indication of monopolistic tendencies in the market. The excess of price over marginal costs in private hospital facilities, as well as high returns relative to costs in other health services in the market, indicate that health service firms in the Philippines have monopolistic features. Combined with the market shares information which suggested competitive elements, the structure that can most usefully describe the Philippine health care market appears to be monopolistic competition.

To follow through the predictions of contestability theory, the following questions can be asked:

a) Do these prices reflect stable efficient prices necessary for financial viability?

b) Will the market settle towards cost-minimization in the long-run?

c) Do these prices result in profits that are sustainable such that incumbent firms will be 'whipped' into behaving by a potential entrant?

The information from price-cost margins alone suggests that profit opportunities exist; violating condition (c) above. Positive mark-ups provide inducements for entry to other firms. The unsustainability of mark-up prices, given that "firms earn non-negative profits at higher costs than necessary" (BPW, 1988; p. 351), makes the approximation of contestable markets' efficiency performance doubtful. That another firm can come in to duplicate the product already in the market, such that it can charge at a lower price and gain a share of the market, and

with existing firms not expecting to respond immediately, provides opportunities for profit for the potential entrant.

The prediction of cost-minimization (condition b above) may not be fulfilled, given the market structure of health care in the Philippines. In monopolistic competitive structures production may not occur at minimum average cost point, implying that there may be persistent excess capacity, i.e. expansion of output possible to lower costs, in the market. With frictionless entry, a more efficient firm can come and offer a product at lower price. While the original conceptualisation of monopolistic competition, following Chamberlin (1933), showed convergence of the market towards sustainable conditions, i.e. non-zero profits (Tirole, 1992), Baumol et al. (1982) argues otherwise:

> ...such a position cannot be an equilibirium in a contestable market. A entrant can closely or exactly duplicate the product design of the firm depicted, and enter at a lower price...there exists (temporarily) profitable entry opportunities, so 'high tangency equilibria' cannot be equilibria in contestable markets (p.332).

Profits, serving as inducements for further entry, are likely to persist given the nature of differentiation or market segmentation as described in the previous section. However, differentiation results in products not exactly duplicated; in which case, the potential entrant is unlikely to charge lower prices, and the disciplining element provided by potential entry does not apply. Martin (1993) noted that "the theory of contestable markets does not apply where products are differentiated" (p.310), as it is actual competition rather than potential competition that drives towards efficient market outcomes. Differentiated markets would not threaten incumbents even if entrants charged slightly lower prices.

Moreover, the fulfilment of the prediction on stable efficient prices (condition c) may not be true for the health care market, as prices in medical care provide a different signal. The price-quality interaction in health care suggests that lower prices may be associated with poorer quality. For this same reason, incumbent prices are likely to be adopted as market differentiation in health care makes direct comparisons of outcomes unlikely. And retaliatory pricing may be unlikely to occur for the same reason that lower prices will be perceived to be low quality. These considerations suggest that there is stability in the health care market; but such a stability does not converge towards zero profit, efficiency outcomes.

6.5 Conclusion

Policy reforms in health care have increasingly looked towards market mechanisms to bring about greater efficiency and therefore release more resources for health care provision.. Contestability theory provides a basis for broadening the 'sway of the invisible hand' by positing that potential entry is a more decisive element of market structure; and that one firm or few firms can still perform in an optimal way, akin to behaviour under competitive conditions, so long as the conditions of entry remain open. The analysis in this chapter has shown that contestability analysis may have limited applicability to the health care market in the Philippines, in the light of the institutional arrangements in the health sector. The structure, exemplified by the health care market in the Philippines, which contain both competitive and monopolistic elements, does not appear to provide the conditions that potential competition is sufficient to discipline markets towards efficient performance. Potential entry as a behavioural postulate appears limited for it masks institutional and behavioural elements

that appear far more prevalent and enduring in health care.

In the context of the analysis on demand, supply, and regulatory structures, the nature of costs do not just relate to the 'sunk' and the nature of technology. Cost function analysis, cited in Chapter 5, showed that the market structure in the Philippines, does not appear to be determined by production technology, as economies of scale appeared to be constant. Nor can it be attributed to superior technology, as economies of scope were found to be weak. Following Shepherd (1984), price-cost margins suggest the existence of substantial sunk costs. There appeared to be *relative* ease of entry implied by supply conditions that showed numerous, small providers in the private sector; and that despite the dominant presence of government, market shares' estimates did not support a concentrated market. The private sector operated as independent firms, in single or small hospitals, or operated as single-proprietorship firms with low assets. The pattern of growth and dispersion of the private sector appeared to have been encouraged by the fee-for-service system of health care financing.

A low demand responsiveness, as shown by the relative inelasticity of demand, suggests that consumers do not respond instantaneously to changes in prices. This relative inelasticity of demand underpins the position of providers in the health care market. The analysis on the regulatory framework suggests that self-regulation by the providers enhance asset-specificity at the occupational level, that is, at the level of entry to the medical profession. The relative ease of entry, suggested above, may relate to the practice market; and therefore masks the nature of costs for firms entering the health care market.

These costs may be attributed to the 'friction' created by the asymmetrical

position of participants (consumers, providers and government), arising from the difficulties of measuring outputs, outcomes and the quality of care. The conditions of supply and demand and the nature of financing and regulations suggest that uncertainties and information asymmetries are prevalent in the country's health market and give rise to the persistent asymmetry between the distribution of resources and health care needs in the country. A further examination of the consequences of these asymmetries for the organization of health care can move the analysis to an examination of the nature of transaction costs, following the lines of theorising by Williamson (1975). For consumers, the costs of illness comprise not just direct fees but also access costs and the consumption of other goods. The entry and exit costs engendered by self-regulation also comprise such costs. The incentives provided by the direct link between financial outlays in health care and provider incomes create incentive problems of moral hazard and adverse selection. For institutional payers, like insurance schemes, the need for close monitoring increase the costs of insurance, leading to inadequate insurance coverage, and therefore, imperfect health care markets. Further work can explore these issues.

The last chapter concludes the study and highlights the study's limitations and implications for further work and policy.

Chapter Seven

Discussion and Conclusion

An analysis of the structure of the health care market has not been adequately examined in the context of a developing economy, much less analysed from an economic perspective. In the light of recent legislative and policy initiatives which have the potential of bringing about major transformation in the health sector in the Philippines, an analysis of the market structure in health care was undertaken.

This chapter discusses the strengths and weaknesses of the empirical anlyses undertaken in Chapters 3 to 6 and indicates the areas for further research. The chapter concludes with the implications, derived from an over-all perspective of the study's findings, for health policy reforms in the Philippines.

7.1 Discussion, Limitations and Further Considerations

The study attempted to contribute to research on the economics of health care by an analysis of the behaviour of a developing country's health care market. This included an exploration on the basic conditions of health financing, demand and supply, and an examination of market structure issues, particularly market shares, the nature of competition and pricing in the Philippine health care system. The analysis undertaken was largely exploratory: drawing upon recent theoretical analyses, utilising original data sets to derive economic (including welfare) parameters on equity and demand, assessing recently available econometric analyses on Philippine hospitals, and providing a developing economy perspective to the emerging discussions on market structure or industrial organization of health care.

The structure of the Philippine health care market was shown to have a weak demand side, adequate health delivery infrastructure characterised by inefficient cost

structures, and widespread cost-price margins. These characteristics, combined with a 'thin market' arising from the lack of ability to pay under a fee-for-service financing system and inadequate insurance coverage, suggest market and institutional rigidities. The findings imply that competitive market reforms alone are unlikely bring about desired health care provision and market outcomes, viewed in terms of improved health conditions, reduced inequities and enhanced efficiency. These findings, however, need to be qualified by the limitations of the approach, data and methodological problems which are discussed in detail below. The discussion includes some suggestions on how the analysis can be pushed forward by further work.

The Financing of Health Care in the Philippines

The analyses described in chapter 3 bring together recent available information and analysis on health care financing, utilising various data sets, to provide a background on the efficiency and equity of the health financing system in the country. The analysis of the pattern of health care expenditures showed that household budgets comprised the largest source of health care spending, with government budgets steadily declining. A comparison of expenditure trends with other countries showed that the country's level of health care spending appear to be correlated with its relative position in health and economic development in the Southeast Asian region.

An analysis undertaken using matched data sets of family income and expenditures survey with the national health survey, the first of its kind in the country, showed that concentration curves of standardised health status and household health care spending were both skewed, with the latter being more so, in favour of the upper income groups. The extent of the skewness, however, needs to be qualified in the light of the limitations, discussed in the text, of the measure of health status used and

the limitations of household expenditures data sets. When a better data set can be made available, ideally from a single source, further work can be directed towards estimating the indices for inequality of health status and spending, controlling for other health conditions, and weeding out collinearity of health status measures with household wealth and access to health facilities.

It was argued that the extent to which third-party payments for insurers can be an influential force in the country's current health system is limited under the present organizational framework. From a general assessment of the private health insurance sector in the Philippine (Chapter 3), it was shown that the problems could be attributed to factors coming from outside the health sector as well as within: from a lack of information about market potential, rigidities in capital markets, and from the affordability of health insurance premiums, with additional loading (shown in table 6.5) by insurance companies to premiums to secure them against what they perceive to be high risks. There is very limited information available on the private health insurance sector in the country. This probably reflects the limited impact of the sector on the organization of health care. Insurance companies were shown to be performing a minimal underwriting role in the health care market by undertaking purely financial intermediation functions (Sec. 3.4). Newly-organized health maintenance organizations (HMOs), on the other hand, did not appear to provide a serious alternative to private indemnity insurance companies, because of higher premiums, limited provider base, geographic concentration and provider or corporate origins. Further work can examine the determinants of the pattern of growth of the companies against industry and macroeconomic developments, as well as health care costs.

The analysis of the compulsory health insurance programme (Sec. 3.5),

Medicare, showed it to have limited coverage (covering less than one-fifth of the employed population), to be biased towards support for hospital care and to offer low support values (paying for a maximum of less than 50 percent of actual hospital bills). The fee-for-service system that prevails, with Medicare paying benefit ceilings with no restrictions on fees charged to patients, has engendered an 'entrepreneurial' health system, and provided incentives for the proliferation of private primary hospitals. Weak monitoring systems have prevented Medicare from checking opportunism and lack of purposeful management and planning has prevented the use of the funds' potential to influence the health system towards efficient and equitable health care provision. Alternative systems of provision, with Medicare contracting with HMOs, did not veer away from the fee-for-service orientation, and the financial risk remained unequally shared between providers and patients, insurers and providers and hospitals. A more analytical examination of Medicare claims data, if these were to be more widely available, would allow estimates to be made of the costs of transactions and the welfare loss from opportunism.

The background information on the equity and efficiency of the financing system provided in Chapter 3 was supported by empirical analyses, in Chapters 4 to 6, which explored the the determinants of demand and supply to gain an understanding of the market structure in health care. Aside from the explorations on market behaviour, policy concerns of generating more resources for health care by imposing direct charges and efficiency improvements, have been directly addressed by the empirical analyses,

The Conditions of Demand

The analysis of health care demand developed in Chapter 4, utilised a model patterned upon that used by Gertler and colleagues (1990; 1987) whose specifications

represent a significant advance from previous consumer health care choice modelling (Bitran, 1988). A study on health care demand in the Philippines by Akin, et al. (1985) had been influential in earlier advocacy of user charges. Subsequent analysis for the country can, therefore, be viewed as a contribution to the on-going debate. Given the equity concerns raised by the policy on user charges, the analysis in chapter 4 captured the differential responsiveness to price and access costs across income groups. The findings suggest that equity concerns can be addressed by price discriminatory policies that impose positive charges to those whose demand is relatively inelastic, and that fees generated can be directed not so much to bring facilities closer to patients, but for cross-subsidising and/or improving services to make them affordable to the lower income groups.

One of the model's strength lies in its consistency with a stable utility maximising framework; allowing simulations to be made for welfare parameters which have not been previously applied to Philippine data. Welfare effects, measured through compensating variation estimates, showed that households needed to be paid amounts ranging from 7 to 10 percent of household budgets to remain as well off after the imposition of fees in public facilities as before the change. With this amount unlikely to be provided from current household and public budgets, given the trends in health care spending, yet, with the amount needed falling below what is currently being paid for the annual premium payments for Medicare, a programme can be designed to pool risks across households.

However, the robustness of the estimates, with high confidence intervals noted for the economic/consumption variables, belies several complex issues in consumer choice which have been abstracted from the model to make it empirically tractable.

Issues related to data problems and statistical bias, as well as concerns on the assumptions of the model, can be raised. These issues are discussed below.

Firstly, the analysis was based on survey data, where the sampling unit is the household. The unit of analysis was the individual, although household characteristics were shown to affect choice. Individual and household characteristics were viewed interchangeably, following a similar approach in human capital theory (Becker 1975). A bias in the error terms that might be introduced by a clustering of some individuals, given the same characteristics of the households they belong to, was shown to have a negligible effect (Section 4.3.2f).

Secondly, data limitations also dictate that some imputations were made for some variables, thereby lessening the variations and weakening their effects. The problem relates, for example, to severity and opportunity costs of time estimates. The concept of severity, relevant to the decision-making process, should be an ex ante evaluation. It was not possible for the survey data to capture this. For the survey, like most survey material, relied on a description of events that already occurred. Severity may have been confounded with other household characteristics like wealth, or by the nature of medical treatment received, and thus, weakening its influence on choice. The simultaneity of severity with income, with a severely ill patient likely to have reduced income, was considered in the discussion (Section 4.3.2) to create a downward impact on estimated price and income effects.

On the other hand, imputing wages for all as weights for the time costs estimates, implied that zero opportunity costs were not possible, an assumption that may not be appropriate given widespread unemployment and the debilitating effects of some illness. The weak time elasticity compared to price elasticity estimates for the

lower income groups may have been influenced by this problem. But the findings on demand for public clinics confirm similar results by Acton (1975), whereby, for those services charging relatively lower, if not zero prices, non-monetary access costs would be more important determinants of choice. While the results of the analysis have shown that indirect access costs deterred upper income groups more than lower income groups, one cannot presume that access costs would be higher in rural areas, despite the distance, because of wage effects. The model did not directly capture the interaction between income and geographic location. If income was shown to vary directly with a specific geographic attribute of the alternatives, the income effects would be likely to be on the lower side of the true effects.

Thirdly, this problem of the interaction between income and geographic effects may also be related to the limitations posed by the manner in which quality was treated in the model. While the model's consideration of quality as unobservable is ingenious, given well-known limitations of exogenous treatment of quality (Wouters, 1991; Bitran, 1988), the extent to which quality and geographic location of facilities may be correlated was not considered. The quality-adjusted price estimates simply assumed that facilities that had higher prices (urban) were of better quality than lower-priced (nearer) facilities. The extent to which nearer facilities may be preferred because of quality attributes of the facility is not considered in the model. Sampling bias may also have had an effect on the results, given the relatively higher proportion of urban households compared to rural households. Further work can look into the observable quality attributes of facilities and the sensitivity of consumers to different quality-types, similar to the analysis undertaken in Lavy and Germain (1994).

Fourthly, the Gertler model used for the analysis of out-patient choice,

considered only patient-initiated visits. The descriptive analysis showed that 67 percent of households reporting the consultations to be their first visits and slightly more than one-fourth (26%) reporting consultations as follow-ups. The model did not distinguish between discretionary and follow-up demand; a limitation that could dampen the income and price effects, as other factors like supplier inducement may be operating.

Lastly, the abstractions of the model from uncertainty raise questions about its ability to illumine actual conditions. There are two levels of uncertainty. The first uncertainty relates to the randomness of illness; while the second type of uncertainty relates to the structure of information: on knowing not only the type of treatment needed but also the quality of that treatment. The Gertler model may be viewed as incorporating the first type of uncertainty, only in so far as uncertainty of demand is related to health need, proxied by age and severity. Age was weakly and negatively related to private doctor demand; while positively and strongly related to public doctor demand. This suggests that the demand for out-patient care may reflect a different risk assessement in the sense that older people, with possibly more serious complaints, would choose public over private care.

The second type of information-related uncertainty is just gaining attention in the literature, and is associated with studies on the demand for health insurance (Feldman and Dowd, 1993). McClellan (1995), following Keeler's (1995) conceptualisation, showed that price elasticity estimates "depend substantially on the nature and magnitude of uncertainty" (p. 242). Incorporating uncertainty implies for further empirical work, including information-related 'nuisance parameters', to prevent bias (McClellan, 1995). The type of health plan can capture the extent to which

uncertainty, and therefore, price effects, may be minimised. The issue cannot be addressed, however, by the available data, as there were no reports of health insurance coverage for out-patient care from the survey.

From the perspective of market structure analysis, the demand parameters estimated in chapter 4, provide vital information on the structure of the demand, and its responsiveness to market or price conditions. When viewed alongside the information on cost structures, the estimated parameters can provide insights into the extent to which textbook predictions on the effects of market structures in health care can be realised.

Supply-Side Conditions

The analysis of supply focused on the production of health care from the perspective of a 'firm'. Due to data limitations, hospitals served as the basic unit of analysis, although a brief description of the organization of out-patient clinic care was presented. The study examined the efficiency of hospital services from the behaviour of their cost structures. Although the hospital survey used in the analysis was undertaken at the same time as the household survey and in the same study sites, due to technical considerations, the household survey did not directly trace reported out-patient utilisation by households to the sampled hospitals. Moreover, the mutually-supportive relationship between private practitioners and hospitals, whereby the latter served as landlords for practitioners, made distinctions between private and hospital practice indistinguishable from the household perspective. Therefore, no direct analytical inference can be made to link the out-patient choice to the hospitals included in the supply analysis. However, the analysis on hospitals can be viewed as a counterpart to the demand analysis on out-patient care to the extent that the hospitals

in the Philippines are largely out-patient facilities. The reported mean in-patient discharges for hospitals in the sample comprised only 18% of out-patient contacts.

The analysis in chapter 5 reported on two pioneering studies on hospital cost analysis of Philippine hospital samples. The secondary analysis cited for the supply-side regressions showed that the cost structures of public hospital facilities were determined largely by the services, in-patient and out-patient, offered; while private hospital cost structures were determined by personnel costs and size. The lack of significance of other variables, especially those representing case mix and quality, demonstrated specification and measurement problems.

Compared to private facilities, higher marginal cost estimates for public facilities suggest inefficiencies. The results from the regression estimates cited were misleading on private out-patients as given the organization of care in private facilities. Out-patient services may not have been adequately captured as some services may be conducted independently of hospital facilities, in physician offices located in the hospital. Despite the multi-product characterisation of hospital firms, the studies only presented a bi-product hospital providing in-patient and out-patient services, which did not provide insights into the extent to which the two services in private facilities may also be correlated. A further aggregation of cases, for example, can provide insights into some cases where out-patient services may prevent in-patient care, or in-patient care may be substituted for out-patient care. Further work can therefore look into diagnostic categories of outputs.

Hospital cost structures did not appear to vary with size or scope of facilities; an observation which suggests that efficiency may depend on other factors not captured by traditional economic models. One difficulty is that these hospital models were

framed in a static manner and therefore ignored the effects of dynamic changes in inputs and technology. Moreover, the omission of variables that capture provider influence and the inadequate and ill-defined measures of quality and casemix could have affected the predictive capacities of the models.

Despite these limitations, Chapter 5 showed that the results and the attendant methodological problems were not unique to the Phlippines. Country studies reviewed by Barnum and Kutzin (1993) showed similar results; and, further highlighted the constraints posed by the data, given the nature of record-keeping in developing countries.

The supply-side analysis has been limited by data access, and therefore, only an analysis of secondary materials has been undertaken. But subsequent work could address the methodological issues raised and examine more thoroughly the production function for private out-patients, incorporating its organizational features, like the number of consultants in various specialties, which are likely to affect the flow of out-patient services provided in hospital facilities. With better data, further aggregation by type of specialty cases, in both public and private hospital facilities, can be made. Such an analysis could capture more appropriately the multi-product nature of hospital firms. Further work can also explore provider influence on hospital cost structures in order to capture market elements impinging on hospital behaviour. A preliminary exploration on aspects of the market structure made in Chapter 6 of this study provides suggestions for further analyses.

Market structure analysis

The analysis of market structure, discussed in Chapter 6, showed that monopolistic and competitive elements were both operating in the market for health

services in the Philippines; and together, these features are unlikely to bring about a fulfilment of contestability theory's prediction that ensuring freer entry or enhancing potential competition will be sufficient to bring markets towards efficient performance: that is, cost minimization, prices equal to marginal or average costs and zero economic profits. The extent to which the market structure of health care in the Philippines may embody the potentials of a competitive or contestable market was examined through the following: a) market shares were estimated for hospitals at the aggregate level using a modified Hirschman-Herfindahl index; b) the nature of this competition was examined, by secondary analysis, in terms of how hospital service outputs were determined by the number of other firms in the market, prices and other hospital characteristics; and c) pricing behaviour was examined in terms of price discrimination and the relationship of prices to costs was compared to infer the extent of 'provider power'.

With no single data base available, the market structure issues were explored using various data sources. Market shares analysis was undertaken from the patient choice data for a hospitalisation episode, using the same household survey used in the demand chapter. The broad aggregation of hospital services and the use of provincial boundaries may have overstated the extent of competition found.

The regressions of the determinants of the hospital service outputs were part of the system of equations used in the cost function estimates cited in the supply chapter. The weak influence of prices, vis-a-vis other factors, in determining hospital out-patient and inpatient outputs, may be due to data limitations. Data on prices or fees, used in these estimates, were either averaged for all services, without distinguishing by types of conditions or complaints, or lifted from revenue data of departments and divided by

the number of patients served. Revenue figures may correlate with size and out-patient fees may correlate with inpatient fees, thereby causing collinearity which may have minimized the impact of the price variables on output.

A comparison of prices and costs from the hospital analysis showed that cost-price margins were present, indicating a monopolistic feature of the market, as well as inefficient, non-cost minimizing behaviour. This was supported by further evidence on the extent of mark-up pricing for other components of the health sector, that is, insurance, drug companies, and physician practice. Data limitations prevent a direct comparison of estimated prices with actual prices. There is no single price posted for procedures in Philippine hospitals. Inpatient prices are based on the type of room accommodations, thus determining the prices of other services, from auxilliary services to physician fees. This suggests that future work can improve on the estimates cited here by incorporating better measures capturing case mix, other measures of size, amenities and organization of care. This would warrant a larger data base than is currently available. Or smaller surveys could be undertaken using case-base analysis to provide better indications of cost and pricing behaviour.

7.2 Summary of Over-all Directions for Research in the Philippines

Given the limitations of the current data available, the analysis of market structure was largely exploratory and approached from a partial view provided by demand and supply parameters, as well as indicators of market structure behaviour inferred from market shares, output and pricing behaviour of hospitals. With better data, a market equilibrium analysis could have been made. Future work can move further ahead of the analysis undertaken in this study, by providing more robust links between demand, supply and the financing aspects of the health care market. Further

work can use the information on the responsiveness of health care demand to link the structure of information with search costs in a pluralistic market -- a line of inquiry pursued by Sattherthwaite (1979). The estimates on economies of scale and scope cited in this study can serve as springboards to examine the effect of demand uncertainty on cost structures of hospital facilities; expanding on work by Gaynor and Anderson (1995), to explore implications for hospital efficiency. Regulations were also viewed, in the study, as passively underpinning the market. Further work can incorporate market structure, the uncertainty of demand, financing and regulatory variables into cost function estimates of specific services.

The study has highlighted the conceptual and methodological difficulties impinging on the economic analysis of the health care market. Further work could consider the empirical and theoretical issues, cited in the separate chapters above, as starting points, given better data and improved estimating techniques. Market structure analysis from an industrial organization framework presents an emerging research area in the light of quasi-market reforms. The analysis of the Philippines' health care system has shown that restrictive assumptions on zero sunk costs, symmetrical behaviour and frictionless transactions, as proposed by contestability analysis in Chapter 6, do not provide appropriate yardsticks to analyse a health care market. The behaviour of costs appeared to be defined less by production and sunk costs, as by costs associated with information asymmetry and 'friction' arising from opportunism of health care agents. An analysis pursued along these lines can examine the degree to which health service institutions, i.e. from physicians and their networks to regulators, use their position to gain a dominant presence in health market transactions, amidst relatively weak demand and regulatory responsiveness, and could

provide more powerful insights than an analysis that merely address the technical barriers to entry. Moreover, a more holistic picture of the analysis of health care in the Philippines can explore the extent to which the structure of information in the market alter the nature of agency in health care and the implicit and explicit contracts engendered. For example, the formation of relational contracts between patients and providers, between providers and insurers, as well as the network of providers with government bodies, can be examined for their implications for the structure of the health care market and consequences for welfare.

7.3 Implications for Health Policy Reforms in the Philippines

The focus of the analysis on market structure in health care provides a coherent framework to view the policy directions that can strengthen the legislative initiatives towards fulfilling their potential for inducing system-wide reforms in the health sector. As the decentralisation and the national health insurance laws have transformed the functions of the Department of Health from direct delivery of services towards planning and financing, a framework for reforms is needed. Health policy reforms in the country should move beyond administrative tinkering of the health system and push towards addressing resource mobilisation and improving the equity and efficiency of the health care market. Towards this end, the market structure framework, which focuses on the importance of entry, conduct and performance of the market, points to three areas for considerations for policy reforms, namely: a) access; b) agency; and c) coordination.

Enhancing Access

The limited extent to which competition can bring about desired market outcomes highlighted the importance of enhancing access to the market, not only from

the supply-side, but from the demand side. This study proposes that a demand-based perspective should be used as a starting point for health policy reforms in the country. The initial conditions for reforms in the Philippines should begin by examining the access for patients. The empirical analyses on financing and demand showed that health care demand was the weakest component of the health care market. Even with adequate infrastructure (which 71 percent of households viewed to be adequate), access remains a problem, especially as such access is determined by one's income. For the majority of the Philippine population, the ability to pay for health care, given the price and organization of medical care, constitutes a main deterrent for entry. Therefore, the process of enhancing entry by consumers can best be seen as part of an over-all initiative of enhancing the system of rights and choices in society to include the poor and marginal members of the community.

Moreover, the evidence on the differential responsiveness of demand and willingness to pay across income groups, examined in Chapter 4, can be used to explore different affordability levels for risk-sharing arrangements. Active fund management and health information/ education programmes by the consumer/ community organizations can provide the conditions for more responsive or elastic health care demand. This entails that a system of signalling the relative scarcities and surpluses in resources must be put in place. Government services may have to reflect closely their costs of provision and correct for inefficiencies.

For the demand-side to have an impact on health sector reforms, it must be felt as a critical mass, as an organized voice. Given the nature the regulatory framework in health care in the Philippines, the transition towards such a provider payment system is likely to be met with strong resistance from providers and their professional

networks as the status quo (the fee for service system) insulates them from risks. Hence, the need to create an organized 'voice', on the demand-side, to push for reforms. Collective action from the demand-side should seek to shape the distribution of benefits and costs, in the country's 'marketplace'; not just in health care services, but also seek to influence the policy process. The Local Government Code, one of the legislative initiatives discussed in the Introduction (Chapter 1), which decentralised the health services, placing it in local authorities' control, presents a potential for the exercise of 'voice', particularly in the representative bodies instituted to provide oversight of the health sector at local level. The composition of the health boards, which agree on budgets and programmes in the local health sector, needs closer scrutiny.

The process of institutional change entails bargaining; an exchange amongst organized bodies to change the 'rules of the game'. Many studies (Abel-Smith, 1992; Barnum, et al., 1995; World Bank, 1987; WHO, 1992), as well as empirical investigations on the U.S. experience (Melnick and Zwanziger, 1988; Culyer and Posnett, 1990) have shown that more active contracting arrangements with providers, rather than one of paying on a fee-for-service basis, provide the best opportunities for controlling health care costs and enhancing provider accountability. Therefore, for recent health policy initiatives to realise greater efficiency in health services and re-distribution of resources and access for the poor, a stronger demand side is a necessary condition for reforms.

Enhancing Agency

Perfect agency implies that there is a coincidence of objectives and preferences among agents in a transaction (McGuire et al., 1988). An agency problem exists,

however, because of the uncertainty and the asymmetric information among agents. From a framework (discussed in Section 1.4.2) which viewed exchange to comprise three markets: 1) in health services, where a physician/provider firm-patient relationship prevails; 2) in regulations, where political decision-making is an exchange between interest groups and government bodies; and, 3) in insurance, where third party payments alter behaviour of patients and providers, the nature of the agency problem in the Philippine health care market was brought out. Market structure analysis showed that health service transactions would not be appropriately characterised as 'arm's length' transactions, given the prevalence of cost-price margins, suggestive of 'market power' (shown in Table 6.5). Descriptive analyses in chapters 2 and 3 suggest that such anticompetitive behaviour is not likely to be limited to the health service markets, but may be found in the regulatory and insurance markets as well. The analyses did not test for the causality: whether market power is a derivative or the source of asymmetries in the other markets; but policy implications can be derived from the analyses which showed the areas where the agency problem may lie.

An analysis of the regulatory framework (Section 2.3) showed that a major source of the problems determining bureaucratic interactions in the Philippines has been the commitment capacity of public and private contracting parties. The inability of government to make credible commitments stems from the multiple sources of power in the legislature and bureaucracy, cumbersome bureaucracy and limited resources that result in payment delays in public-private contracts, and weak enforcement capabilities. Private sector commitment capacity, on the other hand, was also shown to be a problem, given a rent-seeking orientation, weak accountability, as well as concerns that the ability to win contracts were often based, not on track-record, but

on political connections. Enhancing commitment credibility in the public sector is an over-all concern and one in which the solution may largely lie outside the health sector.

Contestability theory posits that the ability for potential entrants to 'discipline' incumbents rests on the ability of entrants to take a share of the market and 'run', if need be, given zero sunk costs. The analysis on the regulatory framework in Section 2.3.2 suggest that 'exit' is a negligible concern among professional self-regulation, compared to the bias for mandatory restrictions on entry through licensing and certification. A first step is to set up credible institutions to facilitate exit: a grievance and complaints committee similar to, but possibly with a wider remit than the General Medical Council in the U.K. (with wider scope to cover institutional competence as well as practitioner competence) . A re-examination of the entry and exit rules, needs to be made to provide adequate signals of quality and consumer protection and not just mechanisms for cartelized-control over the system.

For the insurance market, the passive role of third party payers in the Philippine health care market suggests that insurers do not play a significant role in the health care market, influencing provider and consumer behaviour, unlike their counterparts in the U.S. Although this passivity appears to be reminiscent of health care in the U.S. before the 1980s (Culyer and Posnett, 1990). The continued survival of the traditional indemnity insurers, despite a small demand base because of prevailing low incomes, appear to stem not only from skimming the low risk corporate markets, but also from financial intermediation undertaken through diversified operations. The conditions in the U.S. (Ibid.) which gave rise to insurers having the most impact on the market in health care: tax relief on premiums, spiralling health care costs due to the pace of technology and changing demographics, do not appear to be warranted in the

Philippines at present. However, the conditions that prevent the formation of a national health insurance programme in the U.S. (Rotham, 1993): absence of middle class coalition towards such policy, entrepreneurial character of the medical profession, voluntarism or employers taking the slack in provision, appear to be present in the Philippines, as discussed in Chapter 3.

For state and private health services, enhanced agency may mean greater availability of a basic core of services at the primary level facilities and better quality of services. Human resource development programmes can improve staff morale, boost clientelism (responsiveness to clients' needs) and counter slack. Quality could be enhanced by agreements on standards of good practice, protocols for case management, activities that are directed at greater standardisation of practice to improve quality and lessen uncertainties that lead to high costs of care.

Improving Coordination

Coordination means bringing the various agents in the market together not only to lower the 'friction' from transactions, but also to address market failure. In the context of equity concerns for lower income groups' needs, described in the context of the government's health policy objectives (Chapter 2), coordination also means directing public and private resources towards their needs. The suggestion about enhancing organizations of consumers and communities through collective action could facilitate coordinating functions for government, as such groups could serve as intermediaries through which individual needs could be articulated.

The evidence from market structure analysis (Chapter 6) showed that efficiency and cost-minimizing behaviour cannot be ensured by freer entry and large numbers of providers. With relatively weak monitoring systems amidst a rent-seeking orientation

from agents (Chapter 2), a major coordinating concern is that many of the health care activities in the country occur outside of centralized control; out there in the market in small, atomistic transactions between patients and doctors, as well as vertically-integrated hospital arrangements, and numerous other medical sector firms (as shown in Chapter 6). To regulate the market structure in the Philippines, the government requires access to information. For government policy-making and regulatory functions, the government's capacity to make the 'regulated' disclose information may not be reliable, as the 'regulated' have no incentive to provide it (Le Grand, 1991). The government could, however, use its delivery activities to generate information, on prices and cost-effective mechanisms, that could be used to compare with the private sector and hence track the performance of the health sector. Joint information gathering could be undertaken, with private providers induced to participate by on-site installation of systems to improve their operations. For government and private bodies, investments in information systems are needed. Through stronger decentralised structures, an information network could be set up at local level, involving public and private providers and insurers.

For most consumers, acquiring information on prices and quality occur through informal channels. Improving information channels could enhance access to the system. Knowledge of prices in government and private services through some disclosure rules could lead to over-all transaction efficiency. Pharmacies, for example, are required to post generic prices alongside brand prices to better inform consumers. Hospitals may be required to have posted prices, closely hewed to costs than to amenities.

The market perspective of the study provides useful insights for the transformation of planning functions towards perfecting coordination in the health care marketplace. The study has shown that while health care can be considered a commodity in a private-orientated system such as in the Philippines, the public good characteristics of health care cannot be ignored, specifically its non-exclusionary and merit features which characterise health prevention programmes. These programmes are normally vertically integrated programmes in the Deparment of Health and were not discussed in the thesis which was concerned with health services. It is in reconciling the public-private attributes of health care that poses the challenge for to health service providers and for policy. Recent policy reforms in quasi-market framework highlight that the question is no longer one of whether to regulate or not; nor just simply a choice between public or private provision. Inadequate information on costs, quality and the specific links between health activities and health outcomes, have limited the ability of dichotomous market and government approaches to bring about desired health sector objectives. The policy issue appears to boil down to how private decision-making could incorporate public goals. And how public health care institutions could be made responsive to patient and community health needs. Hopefully, the concerns and the analyses made in the study can contribute towards a greater understanding of the competence of markets and agents to assist policy in determining that the choice is one that achieves a better distribution of benefits for society; with the costs more equally shared.

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Appendix 1

A Description of the Data Bases Used in the Study

1.1 Description of the National Data Base

There are two data sets that are periodically collected by the National Statistics Office (NSO) which provide the benchmarks for national estimates of employment, expenditures, incomes and income inequalities, and other socio-economic measures. These are the Integrated Survey of Households (ISH) and the Family Income and Expenditures (FIES). The 1987 National Health Survey (NHS), also conducted by the same agency, was undertaken as a "rider" to the ISH.

Integrated Survey of Households (ISH)

Conducted yearly and during the four quarters of the year, the core module of the survey was the Labor Force section, often described interchangeably as the Labor Force Survey (LFS). This module involved the collection of data on demographic and socio-economic characteristics. Specifically, the ISH was designed with the following objectives: 1) to gather, process and analyze data on the labor force, the employed and the unemployed, and their characteristics; 2) to gather, process and analyze data on other socio-economic characteristics of the household.

The sampling design of the ISH was the same as that used by the FIES. Provinces, cities and special areas served as the domain of the surveys; i.e., sampling was done at each level. Premiere cities for example Angeles, Bacolod, Davao and Cagayan de Oro, were treated in much the same way as provinces. Metro Manila areas, i.e. Manila, Pasay, Quezon City and Caloocan, were also treated as separate domains, with a special sampling scheme applicable to the exclusive villages in Makati.

Utilizing a two-stage cluster sampling design, sample barangays served as the primary sampling units and the sampling frame utilized for surveys done in the '80s was obtained from the 1980 Census of Population and Housing. Households comprise the secondary sampling units. In selecting the primary sampling units, barangays in each sub-domain were arranged by population size in descending order to form strate of approximately equal sizes. Secondary sampling units were selected systematically with random start.

During selected survey rounds, rider questionnaires on special topics were included, under separate instructions. The National Health Survey (NHS) of 1987 was carried out as a "rider" to the third quarter round of the LFS. The same sample households and survey design were utilized for both surveys.

National Health Survey (NHS)

The 1987 NHS was the third in a series of nation-wide health surveys in the Philippines. The NHS provided information on the level and frequency of morbidity and mortality in the population, practices, attitudes and use of various health and nutrition services. The 1987 NHS was a joint undertaking between the Department of Health and the National Statistics Office, with the NSO serving as the lead agency. The development and preparation of the questionnaire and tabulation plans were made by the DOH, in coordination with an inter-agency committee, while the field operations, processing and tabulation of data were done by NSO.

The survey covered some 18,500 households.

Family Income and Expenditure Survey (FIES)

Data from the FIES provided information on family income and family living expenditures and other related information affecting income and expenditure levels and

patterns in the country. Related information such as family size, occupation, age and educational attainment of the household head and housing characteristics were also included.

The sample households covered in the FIES survey were the same sample households interviewed in the July 1988 and January 1989 rounds of the LFS. The same sampling design is adopted, as discussed above. Some 19,897 sample households were interviewed.

FIES household samples were interviewed in two separate operations, July 1988 and January 1989, using the same questionnaire. The reference consumption period for all food items uses the "average week consumption"(in contrast to the "past week" reference in the 1985 FIES). "Past month consumption" is used for fuel,light, transportation, communication, personal care and effects. All other expenditure groups, including medical care use "past six months" as reference period.

Matched Data Sets

Given this information, the matching of data sets was technically feasible. However, for data processing and publications, these data sets have not been presented as combined. A critical information was the household control number which matches at the regional level. Given the broad reference month used for medical care, the LFS data for 1987 can therefore be used; providing the common link between the FIES to the NHS.

Another consideration for matching was that the reference base should be household information. Beyond the household, NSO puts in raising factors to its provincial and national estimates. Inasmuch as the concern was with household-level use of health care services, the data was associated with a particular household. This

was with exception to the price data. Price data for hospitals and other medical services or goods were gathered from regional level data.

The NHS provided useful information on the utilization of various health care services by households. However, socio-economic data on households was limited. Hence the need for matching with the LFS. However, the income of households was reported in the NHS and all other occupational data used that of the LFS.

While the FIES was fairly comprehensive with socio-economic data and expenditures and income, occupational and wage profile from LFS is fairly straightforward.

This study represented the first known attempt to match FIES with LFS and LFS with NHS.

1.2 Description of the Primary Data Set

The data base for the analysis on household out-patient provider choice utilized a household survey which formed part of a comprehensive research programme involving surveys on health service facilities and financing insitutions. The household survey was conducted under the auspices of a Department of Health (DOH)-commissioned study with the Philippine Institute for Development Studies (PIDS). The over-all project was expected to gather baseline information on health and the behaviour of households, providers and financial institutions to support health financing reforms. From hereon, the primary data set will be referred to as PIDS-DOH data base.

The household component of the bigger project (which included hospitals and private practitioners surveys) was handled by this author. The surveys were conducted professionally by a market research group, Trends, and supervised by the Department of Biostatistics of the University of the Philippines' College of Public Health. A full

description of the survey process is contained in Mendoza (1992). The principal investigators or authors had joint supervisory functions over the survey process. Ownership of the data rested jointly with the authors and with PIDS and DOH.

The surveys were conducted between July - November, 1992.

Sampling Design for the Household Survey

A household survey was conducted in four regions of the country, namely: Regions II, VII, X, and the National Capital Region. A multi-stage sampling was used. The regions were chosen on the basis of socioeconomic conditions (GDP, population and health indicators and facilities), encompassing a poorer region (Region II), middle to upper (VII and X) regions, and a metropolitan area (NCR). Within each of the regions (except NCR), two provinces were selected as sample sites, again, representing a poor and an economically progressive area. In the NCR, study sites chosen were more widespread across cities and towns based on population weights used by the National Statistics Office (NSO).

After the provincial selection, cities or municipalities were stratified within the province according to the category of hospitals located (primary, secondary and tertiary) , as well as ownership (public private). From the city or municipal levels, barangays (villages) were drawn by first stratifying them according to the following categories:

-barangays in cities

-barangays in municipalities with government hospitals

-barangays in municipalities with private hospitals

-barangays in municipalities with no hospitals

Thereafter, the household selection process followed after determining from

local authorities the most recent count of the number of households in the barangay and an ocular survey to determine boundaries. Households were randomly selected. Every fourth house after the random start is included in the study. The respondents were household heads or their spouse. For validation purposes, questions related to specific details of illness or use of facility (i.e. hospitalization) were asked of member-user for every 10th household.

A total of 2,800 households were covered by the survey.

The questionnaire covered the following areas:

1) basic household information; 2) household conditions;

3) employment; 4) income and expenditures; 5) health status of family members: self-reported illness, disability, chronicity, mortality; 6) family health service use: consultations (past four weeks), hospitalizations (past 12 months), usual source of care, source of care for prenatal and immunizations; 7) health care financing data : membership/participation in schemes, 8) knowledge, attitudes and practicies; 9) work environment; and, 10) time allocation.

Sampling for the Facility Surveys

Two types of facility surveys were conducted: hospitals and out-patient clinics. The respondents in these surveys were hospital administrators and providers, respectively. Information from annual reports and/or other hospital files were also examined. Some questions for the out-patient providers were gleaned from clinic staff, after provider authorization.

Chapter 5 and 6 of this study cited the analysis which used the PIDS-DOH Hospital Survey. The hospital survey included 160 hospitals selected by stratifed random sampling design using proportional allocation. The stratification was based on

ownership: public and private; and on facility categories: primary, secondary, tertiary.

The out-patient clinic survey, briefly cited in Chapter 5, was conducted using stratisfied cluster sampling. Five areas of specialisation were targetted: internal medicine, pediatrics, obstetrics, surgery, and general practice. Hospital and non-hospital based clinics were considered. Non-hospital based clinic interviews were conducted in the barangays where the household survey was conducted. Hospital-based out-patient clinics were conducted in tertiary and secondary hospitals included in the hospital survey. Providers were sorted by area of specialisation and in each hospital, 2 providers were interviewed from each area of specialisation. The targetted sample size for out-patient clinic interviews was 400.

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Appendix 2

Formula For Standardization of Health Status

This study's examination of the distribution of health, using self-reported health complaint by income group, necessitated a methodology that attempts to remove the collinearity of demographic variables, age and sex, with income. Age and gender may be associated with income and the reporting of morbidity and the utilization of health care relative to morbidity. Following O'Donnell and Propper (1989), this study used a direct age/sex standardization technique . In the case of the distribution of illness or morbidity, it was carried out by calculating the number in each income group who would report morbidity if that group had the same age/sex distribution as the whole sample. The formula used is as follows,

$$\Sigma_j \Sigma_k \frac{b_{ijk}}{n_{ijk}} \frac{(n_{i\ldots} x n_{\cdot jk})}{N}$$

where:

b_{ijk} = number of individuals reporting morbidity in the i^{th} income group, j^{th} age group and k^{th} sex.

n_{ijk} = number of individuals in the i^{th} income group, j^{th} age group and k^{th} sex.

$n_{i..}$ = number of individuals in the i^{th} income group.

$n_{.jk}$ = number of individuals in the j^{th} age and k^{th} sex group.

N = total number of individuals in the sample.

Reference:

O. O'Donnell and C. Propper, 1989. Equity and the Distribution of National Health Service Resources, Suntory Toyota International Centre for Economics and Related Disciplines, Welfare State Programme Discussion Paper No. 45.

Appendix 3

A Model of the Choice of Out-patient Provider

A.1 Behavioural Model

Chapter 4 of this study applied a health care demand model for the Philippines using the theoretical and empirical specifications attributed to Gertler, et al.(1987) and Gertler and van der Gaag (1990). The model of demand for out-patient health care services used a framework in which utility depends on health and on the consumption of goods other than medical care. Within this framework, an individual must decide to seek medical care if an illness is experienced. The benefit from seeking medical care is an improvement in health while the associated cost is the reduction in the consumption of other goods.

Individuals have to decide not only whether to seek care but also what type of care. Each individual is faced with a set of alternative providers (including self-care) that offers an expected improvement in health for a price. The expected improvement in health (efficacy of health services) depends on the providers skills, individual characteristics (e.g., health status) and other factors. The price of each provider includes both monetary outlays and access costs such as the opportunity of travel time and waiting time. Taking account of this information and their incomes, individuals choose the alternative that yields the highest utility.

Formally, let the expected utility conditional on receiving care from provider j, be given by:

$$(1) \qquad U_j = U(H_j, C_j)$$

where H_j is the expected health status after receiving treatment from provider j, and C_j is consumption net of the cost of obtaining care from provider j, including access costs.

The quality of provider j's medical care is the expected improvement (marginal product) in health when the individual seeks care over the health improvements gained if the individual does not seek medical care or treated himself. Let H_o be the expected health status without professional medical care or self-treatment. Then, the quality of provider j's care is $Q_j = H_j/H_o$, which yields an expected health care production function of the form

$$(2) \qquad H_j = Q_j H_o$$

The quality parameter depends on provider characteristics, and individual characteristics such as education, type of illness and its severity.

Let P_j be provider j's price and Y be income, then:

$$(3) \qquad C_j = Y - P_j - wT_j \; ; \; C_j > 0.$$

Substitution of (3) into (1) yields:

$$(4) \qquad U_j = U(H_j, Y-P_j-wT_j)$$

The unconditional maximization problem is :

$$(5) \qquad U^* = \max (U_o, U_1, \ldots, U_j)$$

A.2. Empirical Specification

The solution to the maximization problem in equation (5) yields a system of

demand functions, whose forms are probabilities that the alternatives are chosen given that an individual experiences an illness.

Gertler's demand model showed that if health is a normal good, then the demand for health increases with income. In a discrete choice situation, this implies that as income increases individuals are more likely to choose higher quality/higher price options. A necessary condition for normality is that as income increases the marginal rate of substitution of consumption for health diminishes, holding health constant.

Gertler and his colleagues pointed out that to allow health to be a normal good, and therefore, to influence the choice, the functional form of the conditional utility function should not impose a constant rate of marginal rate of substitution. An example of such functional form is the semi-translog, where health and access costs enter in log form and consumption in both log and log squared form.

Substitution of (2) and (4) and the health production function into a semi-translog conditional utility function yields

$$(6) \qquad U_j = a_o H_0 + a_0 Q_j + a_1(Y-P_j-wT_j) + a_2(Y-P_j-wT_j)^2 + e_j$$

Note that neither H_0 nor Q_j in equation (6) are observed. The term $a_0 H_j$ can be ignored since it appears in the utility function for all the choices and its value does not vary by alternative and therefore does not influence choice of alternative.

To solve the unobservability of Q_j, we specify a quality or marginal product function for each provider type. Let the expected quality by individual i from provider j be

(7) $$a_0 Q_j = b_j + b_{1j} X + t_j$$

where X is a vector of the determinants of quality (measures of health status and education) and utility from quality, and t_j is a random term. This error term represents un-observed individual characteristics (complexity of complaint) that may affect the provider's marginal productivities; and may be correlated across provider alternatives.

Substitution of (7) into (6) gives the reduced form conditional utility function for provider j,

(8) $$U_j = V_j + e_j + t_j$$

where

$$V_j = b_{0j} + b_{1j} X + a_1(Y - P_j - wT_j) + a_2(Y - P_j - wT_j)^2$$

Note that the intercept and coefficients on the characteristics X vary by alternatives, whereas the coefficients on the economic variables are constant across alternatives.

A.3 The Demand Functions

The demand function for an alternative is the probability that its utility is greater than from any other alternative. Most of the previous studies on the demand for medical care have assumed that this demand take on a multinomial logit form (MNL). McFadden (1981), however, argued that MNL suffers from the assumption of

independence of irrelevant alternatives. This assumption is equivalent to assuming that the stochastic portions of the conditional utility functions are uncorrelated across alternatives, and it imposes the restriction that the cross-price elasticities are the same across alternatives. To relax this restriction, and following McFadden, the demand function is specified as a nested multinomial logit (NMNL). The NMNL allows for correlation across subgroups of alternatives and, therefore, nonconstant cross-price elasticities. Moreover, the NMNL allows the grouping of more similar alternatives so that the cross-price elasticities are more elastic within groups than across groups.

Thus, the probability that provider j is chosen given a decision to seek care and the probability for self-care, is shown respectively:

$$\Pi_0 = \frac{\exp(V_0)}{\exp(V_0) + [\sum_{j=1}^{J} \exp(V_j/\sigma)]^{\sigma}} \tag{9}$$

$$\Pi_i = (1-\Pi_0)\,\frac{\exp(V_i/\sigma)}{[\sum_{j=1}^{J} \exp(V_j/\sigma)]^{\sigma}} \tag{10}$$

where σ is one minus the correlation of the j = 1...J utilities or a measure of the similarity of grouped alternatives introduced by t_j.

The log-likelihood function for this problem is:

$$\ln L_i = \sum_{0}^{J} D_{ij} \ln \Pi_{ij}$$

The estimated demand functions can be used to assess the effect of user fees on demand, in terms of compensating variation estimates. Small and Rosen (1981) showed that the compensating variation is

(11)
$$CV = (\frac{1}{\lambda})[\ln[\exp(V_o) + \sum_{1}^{J} \exp(V_j)^o] - \ln[\exp(V_0^1) + \sum_{1}^{J} \exp(V_j^1)^o]]$$

where V_j and V_j^1 are the initial and final values of the function, respectively, and where λ is the marginal utility of income, shown as:

$$\lambda = \frac{\delta U}{\delta Y} = \alpha_1 + 2\alpha_2 (Y - P_j - wT_j)$$

The marginal utility of income is observed to be approximately constant across small variations in prices. However, for widely varying incomes, λ may vary greatly across individuals within provider alternatives.

References:

P. Gertler and J. van der Gaag, 1990. The Willingness to Pay for Medical Care: Evidence from Two Developing Countries. Baltimore: Johns Hopkins University Press for The World Bank.

P. Gertler, et al., 1987. "Are User Fees Regressive? The Welfare Implications of Health Care Financing Proposals in Peru," Journal of Econometrics 36: 67 - 88.

D. McFadden, 1981. "Econometric Models of Probabilistic Choice," in C. Manski and D. McFadden (editors), Structural Analysis of Discrete Data with Econometric Applications. Cambridge, Mass.: MIT Press.

K. Small and H. Rosen, 1981. "Applied Welfare Economics with Discrete Choice Models," Econometrica 1: 105 -130.

Appendix 4

Hedonic Price Estimates for the Health Care Demand Model

An indirect method of estimating prices can be made through hedonic pricing estimation technique. The method is discussed in Gertler et al. (1987) and Ching (1995). The hedonic price estimation applied in this study follows the procedures in Ching. The equations are no longer repeated here.

The concept of hedonic pricing refers to indirect estimates of prices where market data may not be complete or may be unavailable. Reported prices of medical care are not really prices but expenditures: prices multiplied by quantities ; therefore, the use of indirect prices can provide greater precision to the price estimates (Dor, et al., 1987). The hedonic price equation specifies price to be a function of age, gender, education, illness conditions, market structure and location variables. Market structure variables refer to the number of clinics and number of doctors, per 10,000 population in the village. Location factors distinguishes urban areas, as well as, the regions where the households belong. The prices following this functional form, and estimated using ordinary least squares regression, were applied to all individuals who reported consulting a provider. It was these prices which were used as regressors in the health care demand model.

Moreover, prices also reflect market conditions; such that higher prices may be charged to higher income individuals or in more central areas. Hence, this provides a selection problem in which higher income individuals may choose higher priced providers or go to locations where higher prices may be charged. The issue itself remains to be empirically tested by the health care demand model. This selection problem was initially dealt with before hedonic prices can be estimated.

The sample selection bias was corrected by estimating a reduced form multinomial

logit model of provider choice, from which a Heckman-selection (Heckman, 1976) term was derived for each individual. This selection term (lambda) was included as a regressor in the hedonic price regression. The results are shown in Table A4.

Low coefficients and low t-values seem to characterise the hedonic price estimates. As Ching (1995) observed, these values were also low for Gertler et al (1987). Ching noted that econometric textbooks would not consider variables with small coefficients to be unimported; rather, they may reflect differences in variable units and their variances.

References:

P. Ching, 1995. "User Fees, Demand for Children's Health Care and Access Across Income Groups: The Philippine Case, Social Science and Medicine 41 (1): 37-46.

P. Gertler, 1987. "Are User Fees Regressive? The Welfare Implications of Health Care Financing Proposals in Peru," Journal of Econometrics 36: 67-88.

J. Heckman, 1976. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimators for Such Models," Annals of Economic and Social Measurement 5: 475-92.

Table A4
Hedonic Price Regressions

Variables	Description	Private Doctor		Government Hospitals		Government Clinics	
		Coefficient	T-Values	Coefficient	T-Values	Coefficient	T-values
Constant		0.046	0.19	0.017	0.74	0.126	1.99
Lambda	Selection Term	0.245	0.40	0.000	0.03	-0.006	-0.22
Age	Age: in years	-0.001	-0.50	-0.025	-0.79	0.000	0.60
Male	Dummy Variable : 1=Male	0.066	1.68	-0.025	-0.79	0.010	1.60
Educ	Education: in years	0.002	0.42	-0.025	-0.79	0.010	1.60
Urban	Dummy Variable: 1=Urban	0.025	0.34	-0.025	-0.79	-0.001	-0.69
No. of Clinics \a	Per 10,000 population per brngay	0.118	0.59	0.03	-0.79	-0.005	-0.59
No. of Doctors \a	Per 10,000 population per brngay	-0.002	-1.25	-0.025	-0.79	-0.000	-0.93
Cardiovascular	Dummy = 1 if complaint is so	0.400	4.74	-0.025	-0.79	0.005	-0.02
Respiratory	Dummy = 1 if complaint is so	0.063	1.63	-0.025	-0.79	0.001	0.83
Infectious	Dummy = 1 if complaint is so	0.044	0.85	-0.025	-0.79	-0.005	-0.49
Reg 2	Dummy = 1 for region where located	0.018	0.17	-0.025	-0.79	-0.017	-0.14
Reg7	Dummy = 1 for region where located	-0.129	-2.01	-0.025	-0.79	-0.008	-0.87
Reg10	Dummy = 1 for region where located	-0.096	-1.37	-0.025	-0.79	-0.001	-0.48
prob(self care)	Probability self care is sought	-0.417	-0.35	-0.018	-0.29	-0.164	-1.48
prob(gov't hospital)	Probability gov't hospital is sought	-0.515	-0.38	-0.025	-0.79	-0.032	-0.24
prob(gov't clinic)	Probability gov't clinic is sought	-0.302	-0.23	-0.025	-0.79	0	-0.24

a/ From pre-survey information, PIDS-DOH Data Sets

Appendix 5

Estimation of Arc Price and Time Elasticities

Elasticity refers to the percentage change in variable Y with respect to a percentage change in variable X, and is generally shown in the following formula:

$$E = \frac{\frac{\partial Y}{Y}}{\frac{\partial X}{X}} = \frac{\partial Y}{\partial X} * \frac{X}{Y}$$

The demand model used had prices (P_j) and income (Y) entering the demand functions in a non-linear fashion, it is hard to assess the direction and magnitude of their effects directly from the estimation results of the NMNL. To allow for the estimation of price elasticities, we estimate arc price elasticities of the demand for private doctors, public hospital and public clinics by income quartiles using sample enumeration as shown in Train, 1986.

STEP 1. Estimate the model of provider choice using NMNL.

STEP 2. Categorize sample by quartile and get the quartile means of all the right-hand side variables used in STEP 1.

STEP 3. Reestimate NMNL by quartile and get/compute cumulative probability of provider j. (j = private doctor, public hospital, public clinic) using the means of the quartile.

STEP 4. Simulate a price P (time T) increase by increasing or adjusting P_j (T_j) by x%. [[NOTE: To be able to determine ΔP_j (ΔT_j) to be used in the

initial simulation, print minimum, maximum and mean value of P_j (T_j)] Compute cumulative probability of choosing provider j. The estimated price elasticity is

$$\epsilon = \frac{\%\Delta Prob_j}{\%\Delta Price_j}$$

and the time elasticity is:

$$\epsilon = \frac{\%\Delta Prob_j}{\%\Delta Time_j}$$

that is, the percentage change in the cumulative probability of choosing provider j in STEPS 3 and 4 divided by the % change in the price (time) of provider j. This is the initial price adjustment.

STEP 5. Repeat STEP 4 by simulating another round of price increases (time changes) from the initial level in STEP 4. Note that reference point or base is now the levels of demand and prices in STEP 4.

NOTE: Assume no corresponding adjustment in the price and time price of other providers in response to a simulated price increase (time change) in provider j.

Reference:

P. Gertler, et al., 1987. "Are User Fees Regressive? The Welfare Implications of Health Care Financing Proposals in Peru, Journal of Econometrics 36: 67-88.

K. Train, 1986. Qualitative Choice Analysis, Cambridge, Mass.: MIT Press

Appendix 6: Descriptive Statistics of Sampled Government Hospitals(used for regressions by Zinggapan,1994, pp.30–34)

Variables	Description	Mean	St. Dev.	Minimum	Maximum
Fee per Discharge	Average fee per in-patient discharge	214.77	143.40	31.53	678.25
Fee per Out-patient Visit	Average revenue of hospital per out-patient visit	19.17	22.92	0.31	98.47
Total Discharges	Total in-patient discharges	3956.97	3992.36	578.00	16103.00
Ln (Discharges)	Natural Log of total in-patient discharges	7.88	0.88	6.36	9.69
Out-patients Visits	Total Out-patients visits	22600.48	27726.58	786.00	104038.00
Ln (Out-patient Visit)	Natural log of out-patient visits	9.37	1.19	6.67	11.55
Doctors Fee	Average fee of physicians in municipality where hospital is located, weighted by type of hospital admissions (e.g. charity, pay ward, semi-private,suite)	700.48	520.51	275.00	2183.90
Ln (Doctors Fee)	Natural log of doctors fee	6.04	0.63	5.62	7.6
Beds	Total number of hospital beds	81.70	86.40	10.00	390.00
Ln (Beds)	Natural log of hospital beds	3.96	0.94	2.30	5.97
Other Hospital Beds	Total number of beds in other hospitals in the same municipality	543.67	1707.02	0.00	7689.00
Surgical Patients	Ratio of surgery department discharges to total discharges	0.09	0.06	0.00	0.26
Subsidy per Bed Day	Average subsidy per bed day from government	442.25	190.76	22.21	847.39
Provincial Out-patient Fee	Average of out-patient fee per visit in province	75.96	81.09	7.21	438.10

(continued)

Variables	Description	Mean	St. Dev.	Minimum	Maximum
Insurance Support	Average reimbursement from insurance schemes including medicare per insured discharge	1666.34	4818.47	95.75	28189.75
Ln (Insurance Support)	Natural log of insurance support	6.43	1.19	4.56	10.25
Insured Patients	Ratio of insured discharge to total discharges	0.18	0.13	0.01	0.56
Wage	Average wage per hospital personnel (monthly)	3545.68	916.77	801.74	5580.96
Ln (Wage)	Natural log of wage	8.31	0.36	6.69	8.63
Ln (Out-patient Visit)	Natural log of out-patient visits	8.43	0.94	6.56	10.46
Illness Incidence	Total number of persons with health complaint in the province (in Thousand)	320.10	417.49	22.97	1359.90
Doctors Consultation Fee	Average consultation fee charged by physicians in municipality where clinic is located	52.37	22.79	20.00	114.50
Total Cost	Total operating cost (in Thousand pesos)	12709.30	16450.00	1173.23	85630.30
Ln (Cost)	Natural log of total cost	15.80	1.08	13.98	18.27
Equipment	1 if hospital has X-ray or Ultrasound or EEG machine or CT scan \MRI	0.85	0.36	0.00	1.00
Household Expenditures	Average annual household expenditures in municipality	21315.14	15675.11	3122.60	57243.80

Number of observations = 33

Descriptive Statistics of Sampled Private Hospitals

Variables	Description	Mean	St. Dev.	Minimum	Maximum
Fee per Discharge	Average fee per in-patient discharge	1692.38	2199.71	17.50	8333.61
Fee per Out-patient Visit	Average revenue of hospital per out-patient visit	128.43	90.03	1.81	309.12
Total Discharges	Total in-patient discharges	2796.06	3481.40	120.00	14356.00
Ln (Discharges)	Natural Log of total in-patient discharges	7.34	1.16	4.79	9.57
Out-patients Visits	Total Out-patients visits	6893.72	7045.29	703.00	35040.00
Ln (Out-patient Visit)	Natural log of out-patient visits	8.43	0.94	6.56	10.46
Doctors Fee	Average fee of physicians in municipality where hospital is located, weighted by type of hospital admissions (e.g. charity, pay ward, semi-private,suite)	1804.04	1096.16	367.55	3946.82
Ln (Doctors Fee)	Natural log of doctors fee	7.30	0.67	5.91	8.28
Beds	Total number of hospital beds	50.22	58.66	7.00	246.00
Ln (Beds)	Natural log of hospital beds	3.50	0.87	1.95	5.51
Other Hospital Beds	Total number of beds in other hospitals in the same municipality	1951.88	2610.29	0.00	8057.00
Insurance Support	Average reimbursement from insurance schemes including Medicare per insured discharge	1486.59	2076.16	6.10	9845.51
Ln (Insurance Support)	Natural log of insurance support	6.33	1.73	1.81	9.19
Insured Patients	Ratio of insured discharge to total discharges	0.48	0.30	0.09	1.00

(continued)

Variables	Description	Mean	St. Dev.	Minimum	Maximum
Surgical Patients	Ratio of surgery department discharges to total discharges	0.09	0.09	0.00	0.25
Wage	Average wage per hospital personnel (monthly)	2710.52	808.80	830.56	4176.05
Ln (Wage)	Natural log of wage	7.85	0.37	6.72	8.34
Subsidy per Bed Day	Average subsidy per bed day from government	1.08	4.35	0.00	20.60
Ln (Subsidy per Bed Day)	Natural log of subsidy per bed day	6.33	1.73	1.81	9.19
Illness Incidence	Total number of persons with health complaint in the province (in Thousand)	698.72	571.45	92.33	13.00
Ln (Illness Incidence)	Natural log of illness incidence	12.97	1.09	11.43	14.12
Provincial Out-patient Fee	Average of out-patient fee per visit in province	125.37	120.68	35.07	438.10
Doctors Consultation Fee	Average consultation fee charged by physicians in municipality where clinic is located	74.20	21.93	37.50	114.50
Equipment	1 if hospital has X-ray or Ultrasound or EEG machine or CT scan \MRI	0.81	0.40	0.00	1.00
Total Cost	Total operating cost (in Thousand pesos)	7181.40	17736.90	61.41	96417.50
Ln (Cost)	Natural log of total cost	14.40	1.63	11.03	18.38
Household Expenditures	Average annual household expenditures in municipality	34997.72	15705.93	5024.89	57243.81

Number of observations = 32